# THE IMPACT OF STRATEGIC KNOWLEDGE MANAGEMENT PROCESSES ON SOCIAL INNOVATION PRACTISES

**MUHAMAD NIZAM JALI**



**DOCTOR OF PHILOSOPHY**
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# THE IMPACT OF STRATEGIC KNOWLEDGE MANAGEMENT PROCESSES ON SOCIAL INNOVATION PRACTISES

**By**

**MUHAMAD NIZAM JALI**



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| Nama Penyelia/Penyelia-penyelia<br>*(Name of Supervisor/Supervisors)* | : | **Prof. Dr. Zakaria Abas** |
| Nama Penyelia/Penyelia-penyelia<br>*(Name of Supervisor/Supervisors)* | : | **Dr. Ahmad Shabudin Ariffin** |

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## ABSTRACT

Only recently, various developed countries had been chanting out social innovation as the new paradigm of innovation outcome strategy in addressing social, economic and technological issues in a concurrent way. Social innovation in the context of strategic knowledge management processes creates superior knowledge resource which regard as a new and novel solution that can be embedded into product, process and service which in turn leads to the outcome of improving the quality of people's life, stimulate economic growth and enhance technological aspect. However, social innovation is very much connected with pure social aspects. This study examine and explore the impact of strategic knowledge management processes on social innovation within the context of Malaysian university-industry-community partnership projects funded by the Knowledge Transfer Partnership (KTP) grant program. The main data for this study was collected through survey questionnaires via personnel administered and internet email from 218 project leaders of Malaysian university-industry-community partnership projects. The data for this study were also obtained through face-to-face interview sessions with the academic, industry and community actors within the partnership projects. These data were collected from the period of May 2016 till October 2016. The data was analysed by using Statistical Package for Social Science (SPSS) version 19 software and the content of the interviews data was validated by experience and expert qualitative researchers within the respective field. The findings of this study indicate a significant positive relationship between strategic knowledge management processes and social innovation. Further, hyphotheses testing results also demonstrated that socialization towards leveraging new knowledge resource, ability to transform and absorb new knowledge resource, ICT skills and knowledge and selection process of actors is somewhat needs serious improvements. Furthermore, syncronization of missions, objectives and priorities, high bureaucracy practices, business disclosures issues, innovation specification requirements issues, understanding and commitment issues and financial constraints issues must be dealt with accordingly so that can provide improvements and added value to the existing policy and procedures.




**Keywords:** social innovation, strategic knowledge management processes, knowledge resource.

## ABSTRAK

Sejak akhir-akhir ini, pelbagai negara maju telah melaungkan inovasi sosial sebagai paradigma baharu bagi strategi hasil inovasi dalam menangani isu sosial, ekonomi dan teknologi secara serentak. Inovasi sosial dalam konteks proses pengurusan pengetahuan strategik mewujudkan sumber pengetahuan superior yang dianggap sebagai penyelesaian baharu (novel) yang boleh diterapkan ke dalam produk, proses dan perkhidmatan yang seterusnya membawa kepada hasil bagi meningkatkan kualiti hidup rakyat, merangsang pertumbuhan ekonomi dan meningkatkan aspek teknologi. Walaubagaimanpun, inovasi sosial hanya berkait rapat dengan aspek sosial semata-mata. Kajian ini meneliti dan meninjau kesan proses pengurusan pengetahuan strategik inovasi sosial dalam konteks kerjasama antara universiti, industri, dan komuniti di Malaysia yang dibiayai oleh geran program pemindahan ilmu (KTP). Data utama kajian diperolehi daripada soal selidik melalui kakitangan tertadbir dan email internet daripada 218 orang ketua projek kerjasama universiti, industri dan komuniti Malaysia. Data lain diperolehi melalui sesi temu bual bersemuka dengan ahli akademik dan industri serta para pelakon dalam projek kerjasama. Data-data ini dikumpulkan dalam tempoh Mei 2016 hingga Oktober 2016. Data yang diperolehi dianalisis dengan menggunakan perisian *Statistical Package for Social Science* (SPSS) versi 19, dan kandungan data temu bual disahkan berdasarkan pengalaman dan pakar pengkaji kualitatif bidang masing-masing. Dapatan kajian ini menunjukkan hubungan positif yang signifikan di antara proses pengurusan pengetahuan strategik dengan inovasi sosial. Selanjutnya, keputusan ujian hipotesis juga menunjukkan bahawa sosialisasi ke arah memanfaatkan sumber pengetahuan baharu, keupayaan untuk mengubah dan menyerap sumber pengetahuan baharu, pengetahuan dan kemahiran ICT serta proses pemilihan pelakon memerlukan peningkatan yang serius. Tambahan pula, penyegerakan (*syncronization*) misi, objektif dan keutamaan, amalan birokrasi yang tinggi, isu pendedahan perniagaan, isu keperluan inovasi tertentu, isu kefahaman dan komitmen serta isu kekangan kewangan perlu ditangani dengan sewajarnya supaya boleh memberikan penambahbaikan dan nilai tambah kepada dasar dan prosedur sedia ada.



**Kata kunci**: inovasi sosial, proses pengurusan pengetahuan strategik, sumber pengetahuan.

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# CHAPTER ONE

# INTRODUCTION

## 1.0 Background of the Study

In recent years, the issues of poor social health, poor standard of living, poor education system, public income inequality, massive unemployment and poor economic growth are being identified as the most crucial and long-standing social and economic problems faced by many developed and developing nations worldwide (Kanter, 2013). According to Krlev, et.al., (2014), innovation is the notion that is being regarded as the vital solution in addressing those issues mentioned above. However, the presence paradigm of innovation outcome that refers to technological innovation is perhaps no longer sufficient in dealing with the aforementioned issues (Doherty et.al., 2014). To elaborate further, Makimattila et.al., (2015), stressed that, technological innovation is very much inclined and focus towards private maximization that somehow gives a huge advantage to the commercial driven innovation. Furthermore, according to Lizuka (2013), when technological innovation is adopted within a particular organization, the aspect of social well-being is somewhat being neglected due to its nature that specifically focuses on satisfying private needs. Hence, there is a consensus worldwide on the urgency to find a new paradigm of innovation outcome strategy that can become a better solution in order to solve the pressing social, economic and technological issues in a concurrent way (Kanter, 2013).

Given that, social innovation has emerged as a new and outstanding solution that offers various concern stakeholders a better outcome in dealing with the social, economic and technological issues (Dawson & Daniel, 2010; Pue et.al., 2015). Social innovation can be define as new and novel solution embedded into products, processes and services in order to

fulfil social needs and to improved quality and quantity of life (Krlev et.al., 2014; Altuna et.al., 2015). Subsequently, the contribution of social innovation is said to encompass social, economic and technological aspects (Caulier-Grice, et.al., 2012; Lee & Restrepo, 2015), that includes the outcomes of better living condition of people's life, better environmental condition, better education, better human development, increase in economic growth, increase employment opportunity and also contributes towards profit maximization and private needs (Altuna et.al., 2015). According to Kanter (2013), social innovation helps to improve societal problems by creating new solutions into products, processes and services that work to meet pressing social needs and to improve quantity and quality of people's life. Surikova et.al., (2015) stressed that in the aspects of poor public education system, social innovation offers new solutions that contribute to a better future knowledge worker.

From the above paragraph, social innovation has secured an important place within various nations' core policies worldwide. According to Shaw and De Bruin (2013), the inclusion and incorporation of social innovation into the main stream of national economic policy initiatives started within the developed countries among other in the United Kingdom (UK), United States of America (USA), The European Union (EU) countries and also some developed Asian countries only recently. As evidence, the UK and the EU countries among others, The Netherlands, France, Belgium and Germany have developed various policy initiatives to stress the urgency and the importance of adopting social innovation as a new innovation outcome strategy in their public and private organizations innovation strategy (Hochgerner, 2011; Pue et.al., 2015). As a result, the importance of social innovation had been addressed accordingly in the UK Social Innovation Impacts Investment Policy 2013, The UK Big Society Capital 2012, the EU 2020 Policy Strategy, Dortmund, Brussels Position Paper on Workplace

Innovation 2012, and also European Foundation for Improvement of Living and Working Condition 2012 (Doherty et.al., 2014; Altuna et.al., 2015).

Furthermore, in more recent policy initiatives of the European Commission (2014) on comprehensive guideline report on social innovation highlighted that social innovation is of great potential in addressing complex social, economic and technological problems where other innovation outcomes have been ineffective (Altuna et.al., 2015). Furthermore, the guideline report by the European Commission (2014) emphasised that, social innovation is the flagship program and acts as a problem solver mechanism in addressing the issues of unemployment, poor education, poverty reduction and resource inefficiency that all EU members' countries must be able to overcome by the year 2020. Continuously, another report by the European Commission (2014) on "Social innovation- A decades of change" highlighted that social innovation had contributed towards achieving a relatively higher percentage of citizen's employments, higher improvement on citizen's health, advances in education systems and also enhanced economic growth within the EU countries. In addition, Pue et.al., (2015), also revealed that the adoption of social innovation as a new innovation outcome strategy in the USA policy initiative, has yielded a remarkable return in terms of social and economic benefits among others job creations, public educations, citizen welfare, economic value and commercial success.

From the above paragraphs, most of the developed countries used university-industry-community partnership as the platform to achieve social innovation as a new innovation outcome strategy (Ruede & Lurtz, 2012). The reason why is that academia and university represent a potential important source of superior knowledge resource that is valuable for new innovations that can be embedded into products, processes and services in order to contribute

towards overcoming social, economic and technological problems in a concurrent way (Stam & Martin, 2011). Furthermore, previous studies by Howlett (2010), Hurmelinna-laukkanen et.al., (2012) and Cepeda-Carrion et.al., (2012) found that the association of social innovation as a new innovation outcome strategy and knowledge resource created within the context of university-industry-community partnership produced a superior product, process and service that leads to generating new jobs creation, enhances human capital and skills and also enhances social integrations and formalization for a better quality of working life. Therefore, having a direct engagement among university, industry, community and also government is the cornerstone of achieving a sound success of social innovation (Benneworth & Cunha, 2015). Westley et.al., (2014) highlighted the success of social innovation policy initiatives by various countries worldwide as largely dependent on the vibrant partnership between universities, industry and community entities and also government supports to create new knowledge resource in serving the society and economic needs. Statistically, countries such as the UK, US and EU are increasing the number of policies and allocating substantial amount of financial support to enhance university-industry-community partnership towards achieving social innovation. Table 1.0 shows the governments direct funding on university-industry-community partnership to promote social innovation worldwide.

Table 1.0:
*Government funding on University-Industry-Community Partnership from 2013 to 2015 to promote Social Innovation (SI)*

| Country | Total Government Funding (SI) 2013 (USD) | Total Government Funding (SI) 2014 (USD) | Total Government Funding (SI) 2015 (USD) | % of Nation GDP |
|---|---|---|---|---|
| United Kingdom | 990 Million | 1.0 Billion | 1.03 Billion | 0.3 % |
| United States | 1.049 Billion | 1.063 Billion | 1.094 Billion | 0.6 % |
| European Union | 1.5 Billion | 1.58 Billion | 1.6 Billion | 0.9 % |
| Australia | 700 Million | 750 Miilion | 805 Milion | 0.7 % |
| Canada | 834 Million | 850 Million | 900 Million | 0.65 % |

Source: Organisation for Economic Co-operation and Development (OECD) Statistic Library, (2016).

Table 1.0 summarizes the government direct funding initiatives for university-industry-community partnership from 2013 to 2015 in promoting social innovation. Apparently, The US, UK and the EU members have allocated a substantial amount of financial support towards university-industry-community partnership. This shows that various government acknowledge the importance of university-industry-community partnership in producing superior knowledge resource that is a vital ingredient in achieving social innovation. A part from that, the university-industry-community partnership is regarded as a long-term strategic planning among many nations as mentioned above as an important platform for social innovation. This is consistent with the finding by the UK Department of Business Innovation and Skills Report (BIS), (2014) and also The UK social innovation impacts investment policy (2013) where most of the industries, Small and Medium Enterprise (SME) and community participants within the university-industry-community partnership, indicated that more than 60% of their new innovation is based exclusively on the knowledge resource from the partnership and published research and development report by universities.

From the above paragraph, whilst the combination of social, economic and technological issues become critical for all sectors and countries worldwide, the Malaysian government has also taken initiatives in relation to social innovation program with the rest of the world. Social innovation as a new innovation outcome strategy has been addressed in the National Transformational Policy that runs from the period of 2011 until 2020. The National Transformational Policy consists of two Malaysian Plan (RMK); the 10th Malaysian Plan (RMK-10) from 2011-2015 and the 11th Malaysian Plan (RMK-11) from 2016-2020, respectively. Under the RMK-10, the Malaysian government introduced two major strategies namely: Government Transformation Plan (GTP) and Economic Transformation Plan (ETP). The GTP and ETP acted as the blueprint guidelines for achieving a high income country status by the year 2020. In achieving the above objective, the GTP and ETP outline the main critical areas that need to be addressed. The main areas outlined within the GTP and ETP are among others, raising living standards, improving infrastructures and transportation, reducing cost of living and social problems i.e. crime, corruption, poor education system, human capital development, public service delivery, innovation and public-private partnership, reducing poverty and also financial and entrepreneurship aspects. All of the above are initiatives to address the process of improving the well-being of the Malaysians people and to enhance economic growth which reflect the way 'rakyat' desires and deserves. By fulfilling the aspirations of the 'rakyat', Malaysia as a nation is expecting to have a better Gross Domestic Product (GDP) growth, to improve business performances, to enhance the number of jobs creations, to reduce and eradicate poverty and also to improve the standard of living and well-being of the people.

In similar vein, Malaysia has maintained a remarkable track record on economic growth and development over the past 5 years. From the period of 2011-2015 (RMK-10) the average real

GDP growth for Malaysia was at 5.3% per annum. In the year 2015, Malaysia GDP is stood at USD 375 Billion as compared to USD 255 Billion in 2010. Furthermore, the Malaysian per capita income in the year 2015 is at USD 12,100.00 as compared to USD 9000.00 in the year 2011. Unemployment rate is at steady pace around 3.0 % throughout the year of 2011 to 2015 (MOHE, 2013). Despite being relatively good in economic development, the next five years are expected to be challenging, having taken into account the economic instability for example, the low price of crude oil and other major commodities, the lower currency exchange at any given times, the lack of foreign direct investment and also the slowdown in economies of major trading partners worldwide. Therefore, there is a need to look for other solutions in order for Malaysia to be on the right track in achieving the high income country status by the year 2020, so that, Malaysia can continuously maintain her economic growth and have adequate public funding, enhanced fiscal position and most importantly in ensuring continuous prosperity of its people's well-being.

Continuously, the RMK-11 (2016-2020), acts as the successor of the previous RMK-10 (2011-2015). The policies, programs and initiatives that were development under RMK-10 layout the foundation of social innovation to be included in the master plan of the National Transformation Policy. The RMK-11 with the theme "anchoring growth on people" is the real platform for social innovation to begin with in facilitating Malaysian government to achieve the status of high income country by the year 2020. Social innovation as an outcome of new innovation strategy with hope to propel Malaysia to achieve real GDP percentage of 6 % per annum, Gross national income per capita of USD 15,690.00 which is the threshold of high income country, average monthly household income of USD 2,763.00 and also to increase the quality and quantity of life of the people's index to 1.7 % per annum. Under the RMK-11, social innovation as a new innovation outcome strategy plays the pivotal role as the game

changer in creating a new and novel solution that can be embedded into products, processes and services that can serve unmet social needs which in turn leads to improve the well-being of the people and sustain economic growth. This contribution is outlined in the RMK-11 strategic thrust. In addition, Malaysian Prime Minister, Dato Seri Mohd Najib bin Tun Haji Abdul Razak (2015) stressed that in achieving a high income country status by the year 2020, the government policy and initiatives must focus on the well-being and prosperity of the people's and therefore, Malaysian people is the centre piece of any development efforts. By focusing on the people and delivering a better quality and quantity of life to all Malaysian, Malaysia is expected to achieve high impact outcomes to the capital economy, productivity and innovation as well as the well-being of the people at large.

Like many other developing countries, social innovation as a new innovation outcome strategy is achieved through broader collaboration and partnership between Malaysian private institutions, academic and community institutions. The partnership of university-industry-community involves the creation of superior knowledge resource through the processes of knowledge creation, knowledge transfer and knowledge application within the university-industry-community ecosystem in Malaysia. To elaborate further, the National Higher Education Strategic Plan (NHESP) develops in the RMK-10 and continues in the RMK-11, is specifically design to promote and focus on university-industry-community partnership. Under NHESP, the university-industry-community partnership acts as the platform aim to create knowledge-based ecosystem which helps to stimulate and develop new knowledge resource (MOHE Policy, 2013). Furthermore, the university-industry-community partnership also acts as a catalyst to transform Malaysian education into an export commodity and as a regional centre for academic excellent in Asia. Consequently, these partnerships provide holistic development of character and capabilities, the acquisition of special skills, the

realization of intellectual, physical and spiritual potential and innovative human capital and able to produce superior knowledge which in turn helps to contribute towards social, economic and technological benefits (MOHE Policy, 2013).

Thus, the university-industry-community partnership is placing as an important part of the national Critical Agenda Project (CAP) in helping Malaysia to achieve a high income country status by the year 2020. As a result, Malaysian government with the help of academic institutions, industries organization and community institutions form a strategic alliance partnership and collaboration. Malaysian government as the mediators of these partnership projects allocated RM 64 Million of financial support in the RMK-10 to finance the partnership project and this financial contribution is part of other incentives provided. The Malaysian government continue to fund these partnerships in the RMK-11 and has allocated another RM 100 Million of financial support in the period of 2016 to 2020. Within the RMK-10, the overall 459 projects have been carried out which involves all Malaysian public universities, industries and community partners. The successful of this partnership is paramount considering the huge amount of efforts and contributions made by all parties involved in order to meet the aspiration of the government and the people of Malaysian that wanted to see Malaysia becoming a develop country by the year 2020. Thus, it is important for the Malaysian government to have a feedback through scientific research studies on how this partnership is progressing and whether the outcome is in line with the main objective enshrines in the RMK-10 and RMK-11. Hence, there is a need to explore social innovation as a new paradigm of innovation outcome strategy within the Malaysian university-industry-community partnership ecosystem. This justifies the need for this research. This study intends to examine the impact of strategic knowledge management processes namely knowledge creation, knowledge transfer and knowledge application on social innovation practices in the

context of Malaysian university-industry-community partnership ecosystem with a view to contributes towards empirical evidence and to identify lessons that may be learned and also to formulate a set of recommendations to the Malaysian government, policy makers and parties involves in the Malaysian university-industry-community partnership ecosystem.

This study used workplace innovation (Oeij et.al., 2011; Pot et.al., 2012), organization innovation (Mumford, 2002; Lam, 2004; Camison & Villar-Lopez, 2014) and social capital (McElroy, 2002; Phills et.al., 2008; Adams & Hess, 2010) as the dimensions of social innovation i.e. dependent variable. The use of these three dimensions of social innovation narrow down and limit the broad concept of social innovation and also give a precise focus in measuring social innovation. Moreover, the use of social innovation as a new innovation outcome strategy present and create a new exploration and experience for the university-industry-community partnership particularly in Malaysia ecosystem within the scope of strategic knowledge management processes. Moreover, it also contributes to the paucity of studies on social innovation in terms of its practices and outcome that encompasses the issues of improving social well-being, economic growth and technological advances aspect (Chalmers, 2012; Cunha & Benneworth, 2013; Lizuka, 2013).

This study also used the dimensions of knowledge creation, knowledge transfer and knowledge application i.e. independent variables; in order to have a precise focus in measuring the three main strategic knowledge management processes. To elaborate further, this study used socialization, externalization, combination and internalization as the dimensions of knowledge creation (Nonaka & Takeuchi, 1995; Nonaka et,al., 2000; Nonaka & Von Krogh, 2009; Esterhuizen et.al., 2012); communication and transformation as the dimensions of knowledge transfer (Zander & Kogut, 1995; Gilbert & Cordey-Hayes, 1996;

Argote & Ingram, 2000; Gherardi & Nicolini, 2000; Todorova & Durisin, 2007; Liyanage et.al., 2009) and exploration and exploitation as the dimensions of knowledge application (March, 1991; Zahra & George, 2002; He & Wong, 2004; Jansen et.al., 2005; Vega-Jurado et.al., 2008; Bierly et.al., 2009; Lavie et.al., 2010). Therefore, this study gives emphasis on strategic knowledge management processes namely knowledge creation, knowledge transfer and knowledge application in the university-industry-community partnership ecosystem in Malaysia as the determinants in achieving social innovation. The actors' involve within the university-industry-community partnership ecosystem in Malaysia consist of actors from 1) University; academicians/ researches/ graduate internship; 2) Industry; business owner, members of the company; and 3) Community; selected community members. This chapter starts with the background of the study. The research gap is identified under problem statement section, followed by the research questions and research objectives. This chapter proceeds with the significant of the study. Scope of the study is also identified. Finally the chapter present the outline of the research that shapes the overall structure of the thesis.



## 1.1 Problem Statement

In today's knowledge-led economy, social innovation has becoming a vital and essential innovation outcome strategy within various countries worldwide. Social innovation is adopted in order to improve better living standards, health condition among people, education so as to enhance job opportunities, economic growth and private needs and also the development of innovative human capital (Unceta et.al., 2016). However, when focusing on social innovation as a new innovation outcome strategy within the literature, social innovation is very much under-developed, very limited and inconsistent (Cajaiba-Santana, 2014; Krlev, et.al., 2014; Makimattila et.al., 2015). To elaborate further, review of the literatures found that social innovation is very much central and exclusively connected to the social aspects and social

purposes and it is distinct from any relatedness with other innovation outcomes; for example technological driven innovation (Pol & Ville, 2009; Dawson & Daniel, 2010). This situation leaves social innovation isolated within the scope of social and creates under-value of social innovation outcome (Altuna et.al., 2015). According to Dunphy et.al., (2007), social innovation is not necessarily tied up to address specific social purposes but its significant value encompasses wide range of benefits that include social, economic and technological aspects. To show evidence, previous studies within the context of social innovation among others by McElroy, (2002), Mulgan (2007), and Phills et.al., (2008) are very much focuses on trust, social ties and social capital as a factors to achieve social innovation. Their studies suggested that the aforementioned factors above are predominately developed and diffused through society and specifically for social benefits and purpose. Pol and Ville (2009) highlighted that most of the studies on social innovation is term as pure social innovation whereby innovation created merely to satisfy social and public needs.

Chalmers (2012) and Bitzer and Hamann (2015) highlighted that only recently social innovation had adopted economic and technological outcome in order to add value to its existing social purposes outcome. However, despite the integration of economic and technological outcomes, researches predominantly focus on the conceptual part of social innovation rather than give a useful empirical insight on the contribution of social innovation towards social, economic and technological benefits (Lizuka, 2013; Krlev et.al., 2014). In addition, a review of the literature also found that various researchers among others Klievink & Janssen (2014), Baker & Mehmood, (2015) and Ionescu, (2015) argued and criticized that the concept and measurement of social innovation is unclear, very subjective, ambiguous, and has no fixed boundaries in an attempt to examine its emergence, diffusion and most importantly its contribution towards social, economic and technological benefits. Hence,

meaningful empirical evidence and a clear and precise measurement of social innovation are very much needed so that the contribution of social innovation as a new innovation outcome strategy towards social, economic and technological aspect can be explicitly seen and understood.

Furthermore, literature also suggests that high competitive pressure of private market drives innovation more towards commercial and technological driven outcomes (Kanter, 2013). Past researches have shown that innovation outcomes has been discussed and associated widely with economic value, commercial success and technological advances as a key driver for innovation (Steensma & Lyles, 2000; Maurer et.al., 2011; Lizuka, 2013). For example, previous studies by Tsai (2001), Jansen et.al., (2005), Liao and Hu (2007), Easterby-Smith et.al., (2008), Sammara and Biggiero, (2008), Lichtenthaler and Lichtenthaler, (2009) and Chiva et.al., (2014) found that commercial potential and technological advances are the key aspects of innovation success. Despite the wide recognition given by previous studies on technological innovation in order to determine the success of innovation strategy, Moore et.al., (2012) criticized by stating that technological innovation is not the only notion that determine the success of innovation strategy, but it is somehow part of social innovation outcome. Hence, it is critically important to study concurrently in light to balance out social and technological innovation as an outcome strategy in order to balance out competitive pressure that drives innovation more towards economic value, commercial success and technological advances which has been identified as a huge gap within the literature.

Apart from that, Unceta et.al., (2016), found that the association of social innovation and knowledge resource is the best and ideal solution in producing new highly innovative products, processes and services towards overcoming social, economic and technological

problems. Central to the previous statement, Bartlett and Ghoshal, (2013), highlighted that knowledge resource has been regarded as the new intangible resource for innovation and is replacing old tangible resources of raw materials, monetary and machinery. As a result, various stakeholders among others public, private and academic institutions are giving an increasing attention to strategic knowledge management processes that include the process of knowledge creation, knowledge transfer and knowledge application to generates new knowledge resource for new innovation and to gain competitive advantage (Edler et.al., 2011; Meier, 2011). Within this context, very little research has examined social innovation with strategic knowledge management processes, particularly in the context of university-industry-community partnership towards creating superior knowledge resource (Benneworth & Cunha 2015). Westley, et.al., (2014) highlighted that there is an urgent need of comprehensive overview and analysis on the empirical evidence of social innovation and strategic knowledge management processes. In addition, a complete and extensive understanding on the insight of how social innovation and strategic knowledge management processes is linked and connected across organizations must be seriously engaged (Battisti, 2012; Krlev et.al., 2014).

From the above paragraphs, Malaysia is one of the many nations in the world that adopt social innovation as a new innovation outcome strategy in its main policy agenda. This comes with a view that social innovation can play a pivotal role in helping to achieve the indicators of a high income nation by the year 2020. With the adoption of social innovation as a new innovation outcome strategy, it is expected that Malaysia can achieve a real GDP of 6 % per annum, Gross national income per capita of USD 15,690.00, monthly household income of USD 2,763.00 and also the quality and quantity of life of the people's index increase at 1.7 % per annum by the year 2020, as compared to their existing achievement in 2015 where GDP is recorded at 5.3 % per annum, Gross national income per capita is at USD 12,100.00, monthly

household income is at USD 1,640.00 and quality and quantity of life of the people's index is at 0.9 % per annum.

From the above paragraph, Malaysia has to bring together all resources and put all efforts in order to meet the nation objective in the upcoming 5 years (2016-2020). Furthermore, synchronising social innovation as a new innovation outcome strategy that can contribute towards the indicators of high income country is of great challenge. This challenge is more perceptible in developing countries like Malaysia for certain number of reasons and factors. Firstly, most of the studies conducted on social innovation as an innovation outcome strategy are mainly within the developed countries. Secondly, Howaldt et.al., (2015) stressed that, the adoption of social innovation in the developed countries is just merely to contribute towards strengthening and adding value to their existing highly developed and competitive social, economic and technological system structure. In line from the previous statements, the third reason is that, the realization of full potential of social innovation as an innovation outcome strategy is varied between countries and it is very much dependent upon factors such as level of education among people, human capital ability, production of knowledge resource, highly industrialised countries, current standard of living among people and governance system of a particular nation (Brown & Wyatt, 2015). However, there is some evidence from developed countries on empirical insight on social innovation and its determinants particularly on association with knowledge resource. For example, Mulgan et.al., (2007) Murray et.al., (2010) and Rossi and Rosli, (2013) in the UK, O'Shea et.al., (2008) in the US, Kamoji et.al., (2009) in Canada and Hotho et.al., (2012) and Elliot, (2013) in the EU.

As in the case of Malaysia, the roles of social innovation as an innovation outcome strategy is far more important as compared to its adoption within various develop countries. In Malaysia,

social innovation acts as a critical national agenda program that is being addressed in the RMK-10 and RMK-11 in order to determine whether or not Malaysia becoming a high income country by the year 2020. Thus, for Malaysia to take lessons from the adoption of social innovation within the developed countries is seen inappropriate and may not be applicable considering the nature of social innovation that is being placed in the developed countries, the policy system within the developed countries, the current social, economic and technological performance and the innovative capability of the people within their highly industrialised environment. Therefore, Malaysia must have its own experience in an effort to see social innovation can be adopted efficient and effectively within its own social, economic and technological environment and much importantly to ensure social innovation contribute significantly towards achieving the indicators of Malaysia becoming a high income country nation by the year 2020. A comprehensive study on the matter is highly required which can provide recommendations, feedbacks and added value to the Malaysian government, policy makers and various stakeholders concerned.



Like develop countries, Malaysia also adopts social innovation as a new innovation outcome strategy through the platform of university-industry-community partnership. This partnership is one of the ideal platforms chosen in an attempt to apply and adopt social innovation within Malaysia legitimate public policy. According to Van Wijk et.al., (2008) and Cajaiba-Santana, (2014) the university-industry-community partnership is the strategic platform in creating new knowledge resource towards achieving social innovation. Specifically, the partnership is responsible in creating superior knowledge resource within the environment of knowledge based society. The knowledge resource that is created within this partnership is regarded as a new and novel solution that can be applied into products, processes and services and subsequently have multiplier effects on the actors involved and also society at large, thus,

contributes towards social, economic and technological growth and sustainability as well as improves the quality and quantity of Malaysian people's life. However, empirical evidence on the association of strategic knowledge management processes and social innovation is very much inadequate and underdeveloped particularly within the context of the university-industry-community partnership (Taatila, et.al., 2006; Cajaiba-Santana, 2014; Krlev, et.al., 2014; Westley, et.al., 2014; Makimattila et.al., 2015; Benneworth & Cunha 2015). Therefore, literature acknowledges a scarcity of research undertaken to examine the relationship of social innovation with strategic knowledge management processes within university-industry-community partnership, let alone in developing country like Malaysia, and it is just about time to examine the relationship in the context of Malaysia university-industry-community ecosystem.

Following on, a limited amount of literature was found discussed on the issues of knowledge application as compared to knowledge creation and knowledge transfer (Watson & Hewett, 2006; Meier, 2011). This is disappointing given the importance of knowledge application process might have contributed towards university-industry-community partnership in achieving social innovation (Bierly et.al. 2009; Vasudeva & Anand, 2011; and Akbar & Tzokas, 2013). Hence, more empirical evidence must be undertaken to aid further understanding on how knowledge resource is being applied within the context of Malaysian university-industry-community partnership in achieving social innovation. This study examines the process of knowledge creation, knowledge transfer and knowledge application on social innovation within the context of Malaysian university-industry-community partnership ecosystem but given emphasis on knowledge application process. Moreover, according to Kieser & Leiner, (2009), differences in nature and relationship among actors in the university-industry-community partnership are one of the barriers to adopt social

innovation and associate it with strategic knowledge management processes. A study by Ireland et.al., (2002), highlighted that selecting right partner, building social capital and trust is importance to overcome the differences in relationship, objectives and motivation. Therefore, actors' understanding on social innovation and strategic knowledge management processes within this partnership is critical (Audretsch & Caiazza, 2015). Thus, to ensure the successful of social innovation through strategic knowledge management processes particularly in the Malaysian university-industry-community partnership ecosystem, a depth study must be undertaken in exploring the level of understanding on both social innovation and its association with strategic knowledge management processes among actors and subsequently provide a meaningful understanding towards actors involves.

Therefore, the aim of this research is to examine the impacts of strategic knowledge management processes i.e. creation, transfer and application on social innovation in the context of Malaysian university-industry-community partnership ecosystem. This study focuses to contribute to the gaps identified above which leads to providing a comprehensive feedbacks and guidelines to Malaysian government and all stakeholders concerned in helping Malaysia to achieve a high income nation by the year 2020.

## 1.2 Research Questions

After a comprehensive review of the relevant literature within the fields of social innovation and strategic knowledge management and university-industry-community partnership, FIVE research questions and research objectives are set as follows:

1) To what extend does knowledge creation process significantly influence social innovation within the context of Malaysian university-industry-community partnership ecosystem?

2) To what extend does knowledge transfer process significantly influence social innovation within the context of Malaysian university-industry-community partnership ecosystem?

3) To what extend does knowledge application process significantly influence social innovation within the context of Malaysian university-industry-community partnership ecosystem?

4) What is the level of understanding of association between strategic knowledge management processes and social innovation among actors within the Malaysian university-industry-community partnership ecosystem?

5) What are the actor's roles and the key factors that can potentially impede the process of knowledge application within the Malaysian university-industry-community partnership ecosystem in achieving social innovation?

## 1.3 Research Objectives

1) To examine the relationship of knowledge creation process with social innovation within the context of Malaysian university-industry-community partnership ecosystem.

2) To examine the relationship of knowledge transfer process with social innovation within the context of Malaysian university-industry-community partnership ecosystem.

3) To examine the relationship of knowledge application process with social innovation within the context of Malaysian university-industry-community partnership ecosystem.

4) To explore the level of understanding of association between strategic knowledge management processes and social innovation among actors within Malaysian university-industry-community partnership ecosystem.

5) To identify actor's roles and the key factors that can potentially impedes the process of knowledge application within Malaysian university-industry-community partnership ecosystem in achieving social innovation.

## 1.4 Scope of the Study

This study chooses the entire project of the Malaysian university-industry-community partnership that received funded from the Knowledge Transfer Partnership (KTP) grant program. The university-industry-community partnership project in Malaysia is conducted by twenty (20) public universities that consist of five (5) research universities, eleven (11) focus universities and four (4) comprehensive universities and also involve three hundred and twenty one (321) industries partners and one hundred and thirty eight (138) community partners with overall projects of four hundred and fifty nine (459). This study focuses on the overall four hundred and fifty nine (459) projects of Malaysian university-industry-community partnership which run from the period of 2011 until 2015 under the RMK-10. The project leader of each project represents the respondents of this study. With the financial and non-financial contribution made by various actors within the Malaysian university-industry-community partnership and particularly by the Malaysian government, it is the high concern of the government to see the policy initiative contributes not only to the commercial driven innovation but most importantly towards social innovation that can improves social well-being, economic growth and technological advances that give a significant contribution to the wider Malaysian citizens and contributes to the main agenda and aspiration of Malaysian government that enshrines within RMK-10 and RMK-11.

Regarding the social innovation measurement, this study focuses on the dimensions of social innovation to explore and examine social innovation in the Malaysian university-industry-community partnership project ecosystem. This study considers workplace innovation, organization innovation and social capital as the dimensions of social innovation. Furthermore, this study uses the dimensions of knowledge creation as socialization, externalization, combination and internalization. Dimensions of knowledge transfer as

communication and transformation, and dimensions of knowledge application as exploration and exploitation.

## 1.5 Significant of the Study

A considerable amount of studies within the scope of social innovation in the developed countries is said to focus mainly on the theoretical part of social innovation as a new innovation outcome strategy. Furthermore, literature highlighted that innovation is a notion that is very much central, focused and dominated by technological, private and commercial driven aspects. This situation creates a silo effect that leaves social innovation isolated within the scope of social and have no connectedness with other innovation outcome for example in terms of technological aspect. Thus, this creates under-investment for social innovation considering the massive contribution that social innovation might bring forward into social, economic and technological advances in a concurrent way. Moreover, researches on the association of social innovation with strategic knowledge management processes are very limited particularly within the platform of university-industry-community partnership. Hence, this is an interesting new paradigm that needs to be explored and unravelled, whereby the association of both create a new and novel solution i.e. knowledge resource; that can be embedded into products, processes and services which in turn leads to contribute massively towards social, economic and technological benefits. This study contribute to advances in research that focuses on achieving social innovation through strategic knowledge management processes i.e. knowledge creation, knowledge transfer and knowledge application in the Malaysian university-industry-community partnership ecosystem. Moreover, social innovation is also described as a broad concept in any given fields, thus, it is argued that the measurement of social innovation is very much unclear, ambiguous and connected with multiple references. In consideration of this issue, there is a need to find

methods that can enhance precise focus on measuring social innovation and there is still no considerable amount of literature and researches output on this issue within the literature, let alone in a developing country like Malaysia. Thus, considering the current issues on this area and also base on research questions and objectives developed, this study provide significant contribution to the issue mentioned above.

Furthermore, a research framework then is proposed based on the extensive survey of the related literature. The main contribution of this study within the proposed framework includes social innovation as a dependent variable and knowledge creation, knowledge transfer and knowledge application as the independent variables. This study proposes to examine the relationships that exist between social innovation and knowledge creation, knowledge transfer and knowledge application within the Malaysian university-industry-community partnership project ecosystem. In addition, the use of workplace innovation, organization innovation and social capital as the dimensions of social innovation within the theoretical framework is contributing to enhance precise focus on social innovation. Moreover, the dimensions of socialization, externalization, combination and internalization used in knowledge creation; communication and transformation used in knowledge transfer; and exploration and exploitation used in knowledge application; as independent variables improve and add values to the knowledge on prevailing literature whereby most of the empirical work in the context of association of social innovation and strategic knowledge management processes is fragmented.

The results of this study enhance understanding of the interrelated nature of social innovation and strategic knowledge management processes. In addition, this study contributes to the knowledge development within this aspect, whereby there is a paucity of study to date

examining social innovation as a new innovation outcome strategy through the processes of strategic knowledge management within the context of the university-industry-community partnership. To elaborate further, this study contributes towards adding values to the literature as to how social innovation and knowledge resource associated together and the consideration of social innovation as a new innovation outcome definitely broadens the knowledge of prevailing literature in the context of social innovation. Therefore, this study makes new contributions by enhancing knowledge on the aspect of theory, prevailing literature and developing social innovation and strategic knowledge management within the university-industry-community partnership.

Furthermore, this research output give a clear idea and meaningful understanding to the various actors namely academic, industry and community within the Malaysian university-industry-community partnership about social innovation as a new innovation outcome strategy and strategic knowledge management processes. This meaningful understanding is important in order to develop better policy initiatives in the future and also to make a sound decision making by various actors involved, so that, the partnership works in a dynamic environment and subsequently achieve a successful implementation of social innovation. This aid to fulfilling the Malaysian government agendas and aspirations in achieving a high income country status by the year 2020 and at the same time improving social well-being, economic growth and technological advances.

## 1.6 Outline of the Study

The thesis are organised from chapter one to chapter six. Chapter one comprises a brief outline as to what the research of the study entails. Chapter one provides background of the study. It provides a brief discussion on the research gap identified in the background of the study section. Chapter one also identifies the research gap at length in the problem statements section. Furthermore, chapter one also outlines research questions and objectives, scope of the study and also significant of the study. Chapter two provides a comprehensive literature review of the study. Specifically, chapter two divided into several sections discussing the literature surrounding the context of the study. The literature of innovation in general, social innovation, strategic knowledge management and the processes i.e. creation, transfer, application and university-industry-community partnership were discussing at length. Follow on; chapter three discusses the underpinning theory, hypotheses development and also theoretical framework. RBV and KBV theories are discussed and they provide the holistic view of the underpinning theory of the study. Several hypotheses are then developed to test the relationship between variables. A theoretical framework is created by deriving from the literature of social innovation and strategic knowledge management processes. Chapter four discusses the research methodology employed for this study. The chapter discusses the research design, data collection methods i.e. structured questionnaires and semi-structured interview protocol, population and sampling method, measurement and models of related variables and also data analysis method. Chapter five discusses the analysis and findings of the study and finally chapter six discusses the discussion, addresses the research objectives and questions, contribution of the study, limitation, future research ideas and concluding remarks.

# CHAPTER TWO

# THE LITERATURE REVIEW

## 2.0 Introduction

This chapter presents a critical review of the literature which underpins the context of this study. This study examines the dimensions of social innovation namely; workplace innovation, organization innovation and social capital; and strategic knowledge management processes namely; knowledge creation, knowledge transfer and knowledge application in the context of Malaysian university-industry-community partnership ecosystems. This chapter will discuss in details the literature related to the setting of this study which covers three main areas namely; Social innovation, strategic knowledge management processes and university-industry-community partnership. In addition, each section identifies the practises, knowledge gaps and issues that developed the theoretical framework and justifies the need for this study. Moreover, this study also takes into account other related literature namely triple helix model and quadruple helix model.



This chapter will begin by discussing the social innovation literature in general. Following on, this chapter outline the conceptual and empirical evidence of social innovation dimensions. Next, this chapter discuss the strategic knowledge management processes and its dimensions. Moreover, this chapter will examine the university-industry-community partnership, the triple helix model and quadruple helix model. Finally, this chapter outline the summary of the literature review of the study.

## 2.1 Social Innovation: Definition and Concept

In the early concept of innovation, Schumpeter (1934) describe every firms is in perfect equilibrium where costs and prices are equal and net profit are zero. With the introduction and the effects of innovation, Schumpeter (1934) argued that the capitalist economy is constantly in motion and will never reach equilibrium. This situation Schumpeter (1950, p.31) later described as *"capitalist economy is not and cannot be stationary"*. From the previous statements, Schumpeter (1947) describes innovation as a 'new combination' and 'creative destruction'. Both terms are referred to the introduction of new quality product, new method of production, new market and new source of supply of raw materials as the elements of innovation (McFarling, 2000; Dodgson, 2011). According to Hagedoorn, (1996), the concept of innovation by Schumpeter (1934) is regards as the pioneer work and a source of inspiration to the innovation system and also the basic foundation of innovation concept in today's economic environment (Afuah & Bahram, 1995; Dodgson, 2011; Nicholls & Murdock, 2012).

However, literature argued that the concept of innovation introduced by Schumpeter (1934) which refers to the terms new combination and creative destruction is being criticise as too broad and unclear and also specifically focuses on the complexities of tangible source in achieving technological innovation (Clemence & Doody, 1966). Furthermore, Hagedoorn (1996) assert that Schumpeter's innovation concept is too restricted towards measuring the competitiveness among industry in terms of major technological development such as new commodities, new products and processes and neglect the discussion of intangible source into technological innovation i.e. diffusion of knowledge resource. Since the departure of the early Schumpeter's concept of innovation, there have been a growing number of innovation concept emerged especially in the 1980s. Scholars such as Nelson and Winter, (1982) and Freeman (1982) also focuses on technological innovation as an outcome when discussing on innovation

concept. However, the work of Nelson and Winter (1982) extend the basic foundation of Schumpeter's concept of innovation. In their profound work of innovation concept, they argued that technological innovation not only can be achieve through tangible source i.e. raw materials, monetary and machinery; into products, processes and services but technological innovation can also be achieve through intangible source for example human economic behaviour which consist of knowledge competency, behaviour capacity and learning and routines.

In line with the above argument, Rothwell (1992) developed five stages of technological innovation processes in different periods. In his history analysis, Rothwell (1992) does not imply the existence of a sequential process, as all five generations of technological innovation processes existed based on economic situation at that particular period of time. The first generation (1950s-1960s) of the technological innovation process is the technology driven model, where Rothwell (1992) terms as 'technology push'. In this stage, industry technological innovation is largely depends on the industry Research and Development (R&D). The second generation (1960s-1970s) of technological innovation process is so-called 'need pull' which refers to the customer need-driven, where technological innovation derives from the exploitation of the market knowledge which comes from close interactions with customers and analysis of market indicators (Sammarra & Biggiero, 2008). The first two stages reflect technological innovation as a sequential process and somewhat similar to the earlier discussion of Schumpeter's (1934) concept of innovation. The third generation (1970s-1980s) began to involve general processes of interactions and integrations between technological needs and market needs. The fourth generation (1980s-1990s) involves the notion of global strategy which as a result has seen the rapid growth of strategic alliance between organizations (Contractor & Lorange, 2002) namely R&D partnership, prototyping

and manufacturing with the customers, suppliers and competitors partnership. The fifth generation (1990s-present) is described as the high level of integrations and networking at both intra and inter organizational level. In order to achieve new and high quality of technological innovation into products, processes and services, strategic partnership and alliance between organizations are needed. This modern concept of innovation depends on multiple functions, actors and resources to transform innovative ideas into successful innovation (Sammarra & Biggiero, 2008). Rothwell (1994) highlighted industries that apply the fifth generation process will become the leading innovators in the future. In addition, the fifth generation process of Rothwell (1992) is coined by Chesbrough, (2003) as 'open innovation'. According to Chesbrough (2003), 'open innovation' refers to the new knowledge resource and ideas adopted by organization from outside sources and applied into internal products, processes and organization routines. Therefore, the acquisition and transfer of knowledge resource across organization has emerged as an important strategy for organization.



In line with the early work of Schumpeter (1934), Nelson and Winter (1982) and also Rothwell (1992) on technological innovation concept, present economic environment are forcing global nations moving into a new knowledge based society where various interest actors must be able to explore, create, transfer and exploit new knowledge resource with other partners and organizations (Lichtenthaler & Lichtenthaler, 2009). As a results, according to Chiva et.al., (2014) the modern concept of technological innovation is depending upon knowledge networking and partnership with others and leaving behind an industrial age that based on the transformation of raw materials into finished products in order to stay innovative. The interest of this study is to examine the impact of strategic knowledge

management processes on social innovation within Malaysian university-industry-community partnership ecosystem.

From the above paragraphs, Taatila et.al., (2006) and Dawson and Daniel (2010) argued within innovation literature, innovation concept has been discussed and associated widely towards economic value and commercial success as the key outcome for innovation. Despite the literature highlighted a strong linkage between innovation and technological advancement for commercial profits, this helped open up a new and critical paradigm of innovation outcome that can be contributed towards improved social well-being, enhance economic growth and technological advances (Hazelkorn, 2009; Benneworth & Cunha, 2015). To elaborate further, according to Pol and Ville (2009), this new paradigm of innovation outcome is refers to social innovation and has become a key interest and also a policy targets among various nations worldwide to enhance wider societal benefits and resolving society problem-solving issue and also market driven technical issues (Krlev, et.al., 2014).



From the above paragraph, Mulgan (2007) defined social innovation as the innovation activities to achieved social need that are predominately diffused through organizations whose primarily purposes are social. Phills et.al., (2008) describe social innovation as a novel solution to a society problem that is more efficient, effective and sustainable from the existing solutions and the value created focus specifically to society rather than private individuals. The two definitions of social innovation mentioned above are classified as pure social innovation (Pol & Ville, 2009). In addition, pure social innovation do not includes private market and profit maximization but merely satisfy social and public needs. However, Laursen and Salter (2006) argued that vast majority of social innovation includes and satisfy both businesses and community as a whole.

In line with the above arguments, Pol and Ville (2009) integrates business aspect into their social innovation definition. They defined social innovation as the creation of new knowledge resource and idea to improve macro quality and quantity of life. They describe quality of life as personal characteristics and valuable options that society can be benefited from social innovation outcome for example better education, better health, job opportunity and better environmental condition. Furthermore, they also assert that despite technological and social innovation differences, these two innovation outcomes are overlapping in the sense that technological innovation proved to change people's lives for the better as in the case of biotechnology, information technology, high technology engineering and others. Interestingly, most recent definition of social innovation within the literature includes the aspect of knowledge resource as a determinant of social innovation. Evidently, Sharra and Nyssens (2010) defined social innovation as a new social arrangement which involves strategic knowledge management activities to improve society needs and technological advancement. Furthermore, Altuna, et.al., (2015) defined it as innovative products and services that comes from knowledge activities and are motivated by the goal of meeting a social need, with the opportunity to create new social relationships or collaborations. The working definition of social innovation related with this study is introduced by Benneworth and Cunha (2015). They defined social innovation as a system changing by developing novel solutions in border spanning communities i.e. university-industry-community partnership to create social value and promote community development through strategic knowledge management activities. This definition is in line with the Malaysian university-industry-community partnership objectives that developed by Malaysian government under RMK-10 and RMK-11 respectively. Despite the variation of definitions, the main underlying premise of social innovation is that knowledge based activities creates new solutions into products, services and processes that simultaneously meets social needs and leads to a new improved capabilities and

relationship and better use of assets and resources to enhance social impact and people's lives (Caulier-Grice, et.al., 2012; Lizuka, 2013). Therefore, in viewing innovation towards more holistic interpretation, social and technological innovation through adoption and diffusion of knowledge resource could be understood as components of social change (Edwards-Schachter, 2012).

In addition, Lizuka (2013) highlighted previous understanding of innovation is understood in such a way that new innovation incorporated into products, services and processes is directly introduced into the new market. However, with the emergence of social innovation concept had seen a shift towards this understanding (Lizuka, 2013). The new innovation is share among actors that have similar shared objectives instead of being directly introduced to the market for profit maximization. Antadze and Westley, (2012) describes this as an activities among various actors that collaborate together to shared knowledge resource and towards creating better solutions in improving social well-being. Within the social innovation literature, many authors had illustrated the case of *"fair trade"* and *"microcredit finance"* (Yunus et.al., 2010; Benneworth & Cunha, 2015) in understanding social innovation. This two cases show evidence that social innovation activities produced new products and services that turned to be a driver for social change in achieving economic and social prosperity (Cajaiba-Santana, 2014). Recent research has focused on the role of university-industry-community partnership as the platform of knowledge exchange activities towards achieving social innovation. Evidently, Makimattila et.al., (2015) highlighted that university-industry-community partnership act as an important platform to maximise the benefits of knowledge exchange activities to create new innovation into products, processes and services and to benefits wider social needs. Specifically, their study found that absorptive capacity of actors is the important interconnection in response to improved organization products, processes and

services in addressing the issues of societal needs. Kallio et.al., (2010) stressed that absorptive capacity of an actor's contributes towards social innovation by reinforce, complement and refocus the organization knowledge resource through social activities. A study by Lundstrom and Zhou (2011), on promoting social innovation, shows that knowledge based activities is a platform to enhance social innovation within the scope of social science and technology. They conducted a conceptual study to provide evidence that social knowledge resource helps to foster social innovation as compared to natural sciences. Furthermore, they found that academic entrepreneurship activities within university-industry-community partnership act as a connector to enhance social innovation.

Moreover, Mothe and Uyen Nguyen Thi (2010) suggest that strategic knowledge management processes which involve creation, transfer and application of internal and external knowledge resource increase the organization innovation capabilities that will enhance social innovation. However, various past studies have only interested in examining a general conceptual perspective of knowledge based activities within university-industry-community partnership towards social innovation as an innovation outcome (Perkmann et.al., 2013). This is due to the huge focus given to the technological innovation (Taatila et.al., 2006; Lizuka, 2013) and also partly due to the practitioners not recognising the commercial potential of the idea of social innovation outcome (Kanter, 2013). Moreover, knowledge based activities of university-industry-community partnership covers a wide range of activities ranging from strategic knowledge management processes, academic entrepreneurship and human resource mobility (Hazelkorn, 2009; De Fuentes & Dutrenit, 2012). These activities serve different purposes within the partnership. For example, according to Meier (2011) strategic knowledge management that consist the process of knowledge creation, transfer and application aimed at making knowledge resource visible and to show the role of knowledge resource within the

partnership. Furthermore, incorporated knowledge resource into commercial ends i.e. product, processes and services. Therefore, strategic knowledge management is a vital process and its association with social innovation is crucial and there is an urgent need for more empirical evidence specifically on strategic knowledge management processes i.e. knowledge resource; as a determinant for social innovation.

Apart from that, literature highlighted the conceptualization and measurement of social innovation is being criticized as unclear, ambiguous and connected to multiple references (Ruede & Luttz, 2012; Ionescu, 2015). The primary reason for this is said due to the word social that encompasses the term social innovation (Pol & Ville, 2009). To elaborate further, Franz et.al., (2012) asserts that social innovation is social both in their ends and in their means. This statement justify social innovation as a subjective term surrounding its social processes, social activities and social outcome performed by various actors among others government, public and private organization and community members (Charalabidis et.al., 2014). In addition, social innovation has also been found within the literature is being used in various academic and policy discipline for example in the social and public policy, politics, environmental policy, science and technology and also in the economic and management (Sanzo –Perez et.al., 2015). As a result, many recent scholars argued that social innovation has no fixed boundaries and there is still no clear consensus and lack of focus in an attempt to operationalize and measure social innovation as a structure and outcome in any given discipline (Bulut et.al., 2013; Klievink & Janssen, 2014; Baker & Mehmood, 2015).

Howaldt and Schwarz, (2010, p.7) describe this situation as *'a plethora of vastly diverging issues, subject matters and problem dimensions as well as expectations for resolving social issues are subsumed under the heading social innovation'.* However, according to Antadze

and Westley (2012) and Benneworth and Cunha (2015) alternative way to operationalize and measure social innovation can be based upon various definition given by scholars within the social innovation literature. This might give some insights in order to rationalise the concept of social innovation. Table 2.0 provides the main elements derived from social innovation definitions by some of the most important contributors to date.

Table 2.0
*Main elements of Social Innovation*

| Author | Social Innovation Definition | Main elements |
|---|---|---|
| Mulgan (2007) | Innovation activities and services that are motivated by the goal of meeting a social need and that are predominantly developed and diffused through organizations whose primary purposes are social | • Socially innovative practice<br>• Social need |
| Phills et.al., (2008) | A novel solution to a social problem that is more effective, efficient, sustainable or just than existing solutions and for which the value created accrues primarily to society as a whole rather than private individuals. | • Novel solution<br>• Social value |
| Pol & Ville (2009) | Any new ideas with the potential to improve either the macro quality or quantity of life. | • New ideas<br>• Social value<br>• Quality of life |
| Dawson & Daniel (2010) | The development of new concepts, strategies and tools that support groups in achieving the objective of improved well-being. | • New solutions<br>• Social value |

Table 2.0 (Continued)

| Author | Social Innovation Definition | Main elements |
|---|---|---|
| Caulier-Grice et.al., (2012) | New solutions (products, services, process) that simultaneously meet social need and lead to new or improved capabilities and relationship and better use of assets and resources. | • New solution<br>• Social need<br>• Collaborative networks |
| Cunha & Benneworth (2013) | System changing by developing novel solutions in border spanning communities to create social value and promote community development through collaborative action developing wider networks. | • Novel solution<br>• Social value<br>• Collaborative networks |
| Krlev et.al., (2014) | Maintaining and developing the viability of societies as well as strengthening their self-regulating and problem-solving capacity by creating 'newness' (new products, services and process) through the integration of social and monetary forms. | • Societal outcome solutions<br>• Collaborative network |

Source: Adapted from Benneworth & Cunha (2015)

From table 2.0, most authors outlined the elements of new solution, social value and collaborative networks as the main elements of social innovation. New solution and ideas that can be embedded into new products, services and process is the focus of social innovation activities that driven from socially innovative practises and subsequently changing the way existing assets and resources are allocated (Leadbeater, 2007). According to Klievink and Janssen (2014), social value is the most abstract dimension of social innovation. The measurement is concerned with producing socially just outcomes and improves quality of life (Klievink & Janssen, 2014). Furthermore, Jubert (1999) asserts that social value can be achieved through the promotion of community development, thus enhance social need and

effectively solved social problem (Charalabidis et.al., 2014). Collaborative networks creates collective capacity by integration of various actors in a collaborative ways (Caulier-Grice et.al., 2012). To elaborate further, according to Svensson and Bengtsson, (2010) and Westley and Antadze (2010) collaborative networks dimension connecting individual and organization with different ideas, disciplines and sectors and subsequently creating new knowledge resource and dynamic capabilities within social innovation process. These new valuable resources is then translated into products, processes, services, attributes and assets and leads to unique competitive advantage which cannot be imitated (Nonaka & Takeuchi, 1995). In addition, collaborative networks allows individual and organization actors to act independently for example participation in decision making in order to benefit and protect the social and economic interest of any particular entities (Dawson & Daniel, 2010).

In line with the above paragraph, according to Oeij et.al., (2011), Pot et.al., (2012), Totterdill et.al., (2012) and De Kok et. al., (2014), workplace innovation is an excellent dimension for social innovation in explaining the broad measurement and concept of social innovation. To elaborate further, Oeij et.al., (2011, p.32) stated *'social innovation is a notion more akin to a container than to a workable concept'.* In line with the statement, by using workplace innovation as the dimension of social innovation demarcated the broad concept and measurement of social innovation and helps to enhance the precise focus in measuring social innovation (European Commission, 2014). Within the literature, workplace innovation is said encompasses the aspects of social, economic and technological aspect (Black & Lynch, 2004). To elaborate further, Totterdill and Exton (2014) describe workplace innovation involves actors at all levels in changing the way organization is managed, organized and deployed people, technology and other resources. Furthermore, they also highlighted workplace innovation involves the creation and renewal of new products, processes and services in a

continuous basis and the outcome of workplace innovation is to improved quality and quantity of working life. Moreover, Pot (2011) and Totterdill and Exton (2014) asserts that workplace innovation is an inherently social process which requires learning commitment from diverse source of knowledge resource. In addition, experimenting and challenge established policy through social integration activities by having open dialogue that encourages a strong and new social relationship among actors. Hence, in line with social innovation, workplace innovation is also seen given priority in satisfying both the non-technical outcome of innovation and also technological outcome i.e. social integration, empowerment and quality of work and working life (Erickson & Jacoby, 2003; Heap et.al., 2008).

Within the literature, social innovation is increasingly linked to organization innovation since it also consistently adopts both technological and non-technical innovation as an outcome of innovation strategy (Hage, 1999; Mumford, 2002; Lam, 2004; Ambruster et.al., 2008; Oeij et.al., 2012). In order to show similarities between social innovation and organization innovation, a conceptual study on organization innovation by Hage (1999), refers organization innovation as the adoption of new idea and behaviour i.e. new administrative practices into new products, services, processes and technology that improves organization social value. To elaborate further, Damanpour et.al., (2009) describe that organization innovation improves social value in terms of increase in human capital, improves standard of working life i.e. promotes decentralization, increase employment opportunity and to have better social interactions among organization actors. Furthermore, within organization innovation, Camison & Villar-Lopez, (2014), refers organization innovation as new ideas, new behaviour and new administrative practise to be incorporated into technological innovation i.e. new products, services and technology towards improving organizational social system. To explained further, Mumford (2002) and Camison & Villar-Lopez (2014) highlighted

organization innovation replicate social innovation elements which consist the elements of social integration, social value, and collaborative networks. Moreover, according to Kanter (2000) and Lam (2004) organization innovation predominately integrates social structure to adapt to organizational changes and enhance the capabilities to developed new innovation. As a result, this situation provides a conducive and improves quality of social network interactions among internal and external actors for example managerial, employees, supplier and customer to cooperates (Frambach & Schillewaert, 2002; Ganter & Hecker, 2013).

Within the literature, another outcome that is relevant and intersecting with social innovation is said to come from social capital (McElroy, 2002; Adam & Hess, 2010; Grimm et.al., 2013). Social capital as a dimension for social innovation can be seen through social networking and collaboration for knowledge resource exchange and capacity building (Grim et.al., 2013). The similarities of social capital and social innovation lies in the identification of how collaborative networks to creates a new knowledge resource that can be embedded into products, processes and services comes from strong social relationship and trust among actors (Adam & Hess, 2010). Moreover, according to Manning (2010), social capital is the outcome that focuses on social structures and interactions among various actors in creating new knowledge resource towards social and economic benefits. The notion of social capital predominantly refers to the social structure (social interaction ties), relational structure (trust and trustworthiness) and cognitive structure (shared vision) among individuals, networks and community level (Coleman, 1990; Alguezaui and Filieri (2010). The above structures create new knowledge resource that enhance social value and produce better public goods to the society (Tsai & Goshal, 1998; Adler & Kwon, 2002; Wasko & Faraj, 2005).

Therefore, this study will used workplace innovation, organization innovation and social capital as the dimensions in measuring and operationalized the broad concept of social innovation. Next section will discussed in detail the three dimensions of social innovation.

### 2.1.1 Previous studies on Social Innovation dimensions

This section presents previous studies investigating factors that influence social innovation i.e. workplace innovation, organization innovation and social capital.

#### 2.1.1.1 Workplace Innovation

The discussion of workplace innovation in an organization is catalyst by the works of several EU nations among others in the Netherlands, Germany and United Kingdom only recently i.e. in the 21st century (European Commission, 2014). This can be seen in their various policy level documents among other in the EU 2020 policy strategy, Dortmund, Brussels position paper on workplace innovation (2012) and also European foundation for improvement of living and working condition (EUROFOUND, 2012). All of these policy documents stressed the importance of workplace innovation towards EU competitiveness (Totterdill, 2012). Within the literature, workplace innovation is described as a strategic innovation renewal that comes from internal and external knowledge resource cooperation, new products, processes and services, finding new market and clients towards improving quality of working life i.e. social innovation (Oeij et.al., 2011; Pot, 2011). Based on the previous statement, workplace innovation can be seen as combination aspect of commercial benefits which includes commercial innovation, competitive advantage and profit-making and also social purpose (European Commission, 2014). Heap et.al., (2008) and Dortmund, Brussels position paper (2012) highlighted within workplace innovation, social purpose is the aspect that shapes workplace innovation that refers to employability, empowerment, health and safety, balancing

job demand and private life, employees job satisfaction and well-being and human capital i.e. social innovation (Pot & Koningsveld, 2009; European commission, 2014). To elaborate further, Erickson and Jacoby (2003) argued that workplace innovation does not constitute technological innovation, if technological innovation is seen within the workplace innovation it is just merely a complementary. Moreover, Pot (2011) and Oeij et.al., (2011) highlighted any innovation that does not consider social aspect cannot be effective and therefore, they regards workplace innovation as a mirror term of social innovation. Eeckelaert et.al., (2012) elaborate that within today's knowledge-led economic, workplace innovation must be seen encompasses social, economic and technological factors.

Literature highlighted that the growth of workplace innovation is said due to four main reasons (Pot & Koningsveld, 2009). The first reason is the need to enhance labour productivity with particular emphasis on level of welfare and social security that gives emphasis on flexible working hours. The second reason is the urgency to develop and utilise the skills and competencies of the workforce in order to cope with knowledge based economy. The third reason is to help private and public organizations to maximise the full potential of social innovation by embedding it into workplace innovation i.e. social innovation elements. By encourage the commitment and involvement of employees towards utilization of new internal and external knowledge resource for products, processes and services (Volberda et.al., 2013). The fourth reason is said due to the importance of social innovation elements as compared to solely technological innovation. According to Pot and Koningsveld (2009) in an innovation studies research indicates that technological innovation only contributed 25% of new innovation success as compared to workplace innovation i.e. social innovation elements, which contributed 75% of new innovations success.

A review of the literature found that dimensions of workplace innovation consist of strategic orientation, product-market improvement, flexible work/ autonomy and organizing smarter (Oeij et.al., 2012; Volberda et.al., 2013; De Kok et.al., 2014). According to Oeij et.al., (2012) strategic orientation relates to the environmental factors such as customer behaviour, the development of new technology, legislation and regulations. According to De Kok et.al., (2014) workplace innovation must be able to adapt with these changes by having networking and collaboration with external partners in terms of knowledge based activities. Product-market improvement is concern with the improvement of products, services and processes and searching for new markets and customers. Moreover, flexible work refers to the employee's related social well-being among others on the issue of employability, empowerment, health and safety, working hours, employment relations, work performance and satisfactions and other social related issues (Pot & Vaas, 2008). Organizing smarter concern with the issue of workplace ability to produce new changes in terms of organizing, employee's deployment and technical application towards improving work process. To elaborate further, Oeij et.al., (2012) highlighted the four dimensions of workplace innovation can be categorised into two category. Strategic orientation and product-market improvement focus on workplace external condition and development i.e. market oriented, while smart organizing and flexible work focus more on internal workplace issues i.e. human resource and social factors. Within the literature of workplace innovation, various empirical studies focus on the effects of workplace innovation. This studies either examining workplace innovation as an outcome or as a process of innovation. Within the scope of workplace as an outcome of innovation, there are several studies indicate that leadership, organizational climate, autonomy, personal characteristics, level of educations and also trade unions either positively or negatively related towards workplace innovation. Evidently, for leadership, a study by McMurray et.al., (2013) in the Australian non-profit organization revealed that good transformational and transactional

leadership directly promotes workplace innovation. Furthermore, on organizational climate, Von Treuer and McMurray (2012) examining organizational climate that consist the elements of autonomy, work cohesion, work pressure and recognition and innovation. The study shows that organizational climate particularly the element of autonomy and worker cohesion and recognition is significantly encouraging workplace innovation (McMurray et.al., 2013). As for Yesil and Sozbilir (2013) they explore personality characteristics towards enhancing workplace innovation. An interesting finding from the study revealed that openness to experience is positively enhancing workplace innovation. Other study by Vila et.al., (2012) also shows that the increase level of education among employees have a positive effects on workplace innovation. Another important finding on workplace innovation is the role of trade unions towards enhancing workplace innovation (Gill, 2009; Totterdill & Exton, 2014). According to Totterdill and Exton (2014) trade unions enhance workplace innovation by encouraging interactions and integrations of knowledge resource sharing and activities among members. This provides a conducive and rich learning opportunity through various social channels within and outside organization. However, Wilkinson et. al., (2014), found that trade unions does not have a significant impacts towards workplace innovation and suggest that focus should be given more on organization climate i.e. for example teamwork, flexible management, autonomy and training to enhance workplace innovation. Within the scope of workplace innovation as a process innovation, Kim and Bae (2005) examining the impact of workplace innovation towards organizational performance in the two Korean multinational corporation. The study revealed that workplace innovation through the implementation of good employment relation and human resource management enhance organization performance. Furthermore, Pot (2011) also examining workplace innovation and organizational performance within various Dutch organizations as a sample case studies. The studies also found those organizations that perform workplace innovation have a positive

relationship towards organizational performance in terms of turnover, profit and labour productivity and also organization productivity growth rates (De Kok et.al., 2014). Several studies also indicates the used of information technology as an enablers of workplace innovation in achieving organization performance (Black & lynch, 2004; Oeij et.al., 2012). For example, Black and Lynch (2004) indicate that information technology roles within workplace innovation enhance organization productivity and performance through upgrading employee's Information Technology (I.T) skills and competency. Workplace innovation covers the fields of organization learning, human resource management and supportive technology in creating new innovation for a better quality of working life (Pot, 2011). These fields connected to each other to create dynamic capabilities to the organizations to improve quality of working life and organizational performance (Pot & Koningsveld, 2009). Workplace innovation is related to RBV theory through the combination of resources and capability that are valuable, inimitable, unique, and no substitute (Barney, 1991; Amit & Schoemaker, 1993) which is the central tenet to RBV. Therefore, in line from the previous statements, this study will focus on strategic knowledge management processes as new determinant to create dynamic resources and capabilities which can enhance workplace innovation.

#### 2.1.1.2 Organization Innovation

The discussion on organization innovation received a growing interest from both academicians and practitioners in the late 1950s (Slappendel, 1996). This is due to the fact that organization innovation contributes immensely to the economic progress (Hage, 1999), institutional change, dynamic knowledge society and also its important role in facilitating organization social prosperity (Hage & Powers, 1992; Budros, 2000). Moreover, in today's new knowledge-led economic perspectives, issues on globalization, rapid organizational and

technological change and social problems warrants organization to stay innovative in order to survive and contribute towards social growth (Armbruster et.al., 2008; Wineman et.al., 2009). Interesting, statement made by Hage (1999) acknowledge that technological and society problems can be overcome through the continuous implementation of organization innovation. Battisti and Stoneman (2010) suggest that in order for any organization to have full benefits of innovation, organization must viewed innovation beyond the ubiquitous scope of technological innovation. Furthermore, innovation must be accompanied by other related innovation for example non-technological innovation i.e. organization innovation (Birkinshaw et.al., 2008). As a result, the adopted of both technological and organization innovation will derived a potential synergies and extra gains for organization to contributes towards organization competitiveness and organizational social change (Amabile, 1998; Andriopoulos, 2001). In line with the above statements, organization innovation is consistently associated with the adoption of an idea, behaviour and practices that is new to the organization (Daft, 1978; Damanpour, 1988). Amabile (1998) suggests that organization innovation is a response to the changes that comes from organization internal and external factors and also as a pre-emptive action taken to influence an environment. According to Damanpour et.al., (2009) the new idea, behaviour and practices i.e. new administrative practices, is embedded into new products, processes and services that creates dynamic capabilities for organization. To elaborate further, researchers have adopted the notion of new administrative practices in the perspectives of organizational structure, human resource (Ettlie & Reza, 1992) and managerial practices (Battisti & Stoneman, 2010). Within the literature, many scholars consistently show similarities in defining organization innovation. This similarity is refers to the notion new organizational method, managerial and working concepts and practices i.e. new administrative practices (Camison & Villar-Lopez, 2014). Table 2.1 presents a summary of organization innovation definition by some of the researchers deems to

be the most important contributions to organization innovation literature in relation to the notion of new administrative practices.

Table 2.1
*Organization Innovation Definition*

| **Author** | **Definition** |
|---|---|
| Daft (1978) | New organizational structure and administrative processes. |
| Damanpour & Evan (1984) | New organization structure, administrative processes and human resource. |
| Damanpour et.al., (1989) | New administrative component that affect the social system of an organization. |
| Bolton (1993) | The implementation of new ideas, procedures and structures in the management of the firm |
| Armbruster et.al., (2008) | Changes in the structure and processes of an organization due to the implementation of new managerial and working concepts and practices towards enhancing social value i.e. interactions. |
| Battisti & Stoneman (2010) | New management practices, new organization, new marketing concepts and new corporate strategy towards enhancing social capital of wider community. |
| Damanpour & Aravind (2012) | New approaches in knowledge for performing management functions and new processes that produce changes in the organization strategy, social structure and administrative procedures and system. |

Table 2.1 (Continued)

| Author | Definition |
|---|---|
| Camison & Villar-Lopez (2014) | Implementation of new methods for organizing routines and procedures such as establishing databases of best practice, improving worker retention and introducing management systems. Implementing new methods such as distributing responsibilities and decision-making among employees for divisional work and new concepts for the structuring employee's activities. New organization methods for acquiring knowledge through external relationship with other firms or public institution such as collaboration with research organization, customers and suppliers. |

Source: Adapted from Camison & Villar-Lopez (2014)



From table 2.1, Lam (2004) and Armbruster et.al., (2008) highlighted the development of organization innovation involves in three different perspectives towards creating new administrative practices. The first development of organization innovation concerns with the structural characteristics of an organization and its propensity to innovate. Organizational structural characteristics involve individuals in the organization, organization policy and formal structure and organizational social relationships and its effects on products and technical process innovation (Wineman, 2009). The second perspective of organization innovation is concern with the ability of an organization to respond and adapt to the economic, technological and social change (Teece, 1998). This perspectives involves the consideration of understanding with regards to organization resistance to change and developed models for organization to have a better understanding in responds to economic, technological and social change (Armbruster et.al., 2008). Moreover, the third perspective of organization innovation is related to the organizational cognitive and learning. This perspective relates with the new paradigm of social innovation. To elaborate further,

according to Lam (2004) cognitive and learning is refers to the adoption of new intangible source of innovation i.e. knowledge resource; that created from collaboration with internal and external organizations. This new knowledge is regards as new and novel solution that can improve organization new administrative practices (Camison & Villar-Lopez, 2014). In addition, the collaboration integrates social processes in the formation of collective learning and knowledge structures that benefited actor's social capital and social needs (Lam, 2004). Furthermore, Armbruster et.al., (2008) and Leovaridis and Popescu (2015) stressed that organization innovation consist of structural and procedural organization innovation. Structural refers to line of responsibilities, accountability and commands. Procedural refers to routines processes and operations of the organization (Kannan & Tan, 2005). According to Mol and Birkinshaw (2009), Total Quality Management (TQM), Just-In-Time (JIT) and Supply Change Management (SCM) are the notable example of new administrative practices adopted by organization.

Within the literature, many conceptual and empirical studies have been carried out by various researchers to find out the determinants of organization innovation. A conceptual study by Hage (1999) focuses on exploring the complexity of the division of labour as the determinant of organization innovation. The complexity of division of labour deals with the issue of organization ability to learn new knowledge resource, ability to solved problem and creativity capacity of the organization. According to Hage (1999) study finding, the complexity of divisions of labour is significant towards the propensity of organization to innovate. Furthermore, a conceptual study by Wineman et.al., (2009), exploring on organizational structure shows that spatial layout have a strong positive role towards enhancing organization innovation by providing better coordination and connectedness among employees in terms of communication and social relation. Empirically, Jung et.al., (2003) examining the role of

leadership towards enhancing organization innovation. They conduct the empirical test in the Taiwan electronic and communication organization. The study revealed that transformational leadership style has a positive and significant relationship on organization innovation through the practises of empowerment and continuous support for innovation. Furthermore, researches done by Gumusluoglu and Ilsev (2009) and Garcia-Morales et.al., (2012) also found that transformational leadership have a significant positive effect on organizational innovation. They highlighted transformational leadership enhance employees creativity towards organization innovation through motivation, empowerment and perception of support for innovation. Build upon the earlier study by Jung et.al., (2003) and Gumusluoglu and Ilsev (2009) and later study by Garcia-Morales et.al., (2012), Crossan and Apaydin (2010) acknowledge the role of leadership by stating the role of leadership is important for spearheading organization innovation continuously from the early process until the end results.

Furthermore, within the literature, substantial amount of studies indicates that organizational structure and attributes influence organization innovation (Rosner, 1968; Damanpour, 1991; Bolton, 1993; Frambach & Schillewaert, 2002). Starting with the early study by Rosner (1968) on organization structure and attributes towards organization innovation. The study indicates that the elements of resources and economic orientation of an organization enhance organization innovation. Furthermore, on the later study, Damanpour (1991) introduced more details and specific elements of organization structure and attributes in expanding the earlier study by Rosner (1968). The study examines new elements of specialization, departmentalization, professionalism, formalization and centralization apart from the elements of resources and economic. The study revealed that specialization, departmentalization, professionalism and resources have a positive relationship with organization innovation.

However, formalization and centralization does not enhance organization innovation. In more recent studies on the effects of organizational structure and attributes towards organization innovation, Wan et.al., (2005) conducted a research examining organization innovation and its potential determinants in Singapore organizations. The result indicates a positive and significant relationship between decentralization and organizational resources towards organization innovation. They highlighted organization that has a proper funding and allocation for innovation program within organization is highly likely to apply continuous innovation practices.

Furthermore, other study by Polder et.al., (2010) found that information technology have a significant positive effect on organization innovation. Interestingly, according to Brynjolfsson and Hitt (2000) investment in information technology is more significant as compared to R&D investment in order to ensure continuous capacity for organization to innovate. Moreover, Jiang et.al., (2012) also conducted a research within the scope of organization structure and attributes examining the role of human resource management towards organization innovation. The study revealed that human resource management process in terms of hiring and selection, rewards, job design and teamwork enhance employee's creativity towards achieving organization innovation. In addition, there are also empirical studies that confirm organizational characteristic such as size and age of organization is positively related to the organization innovation (Kimberly & Evanisko, 1981; Damanpour, 1992). Camison- Zornoza et.al., (2004) conducted a study by using previous empirical studies on organization size and innovation that published in the important journal of business administration. The study confirms the existence of a significant and positive correlation between organization size and organization innovation. Furthermore, Mol and Birkinshaw (2009) also indicates that the larger the organization enhances its propensity to innovate.

Furthermore, another research done by Sorensen and Stuart (2000) on various organization sectors on patenting innovation in US revealed that aging organization strongly support and generate more innovation. They highlighted as the age of the organization increase, the more competence they become to produce new organization innovation. In contrast, they also argued that aging organization tend to be left behind in keeping pace with the current economic environment and economic competitiveness and as a results, organization innovative outputs tend to become absolute (Beuno & Ordonez, 2004). Next section will discuss on social capital as the third dimension of social innovation for this study.

#### 2.1.1.3 Social Capital

The concept of social capital has first come into existence in the aspect of sociology. The early notable scholar among others Jacob (1961), Coleman (1988) and Bourdieu (1989) refers social capital as the network and relational process that involves attributes of personal ties, trust and shared resources that are useful for the development of individual's human capital in wider social community (Tsai & Goshal, 1998). From the early sociology scholars above, it can be summarised that social capital involved a close interpersonal relationship among individuals within the social collaborative networks. This social network consists of various resources which need to be leverage and made it useful to improve living condition of wider society. Moreover, in order to take full advantage of social capital benefits, actors within the network structure must possess strong ties, high level of trust and norms among them (Narayan & Cassidy, 2002). From the previous statement, according to Portes (1998), social capital is the ability of the actors to secure benefits by virtue of memberships in social networks or other social structures. Putnam (1995) also acknowledge that social capital consist the aspect of social ties, social trust and social norms which enable actors to act

together more effectively to pursue shared objectives for the benefit and positive development of wider society.

In the aspect of economy and organization studies, the concept of social capital is described as organization social networks and collective action where it involves high level of interpersonal trust, ties and norms of mutual aid and reciprocity that enhance individuals and organization dynamic capabilities and resources towards producing new innovation i.e. products, services and processes to the wider community (Coleman, 1990; Bolino et.al., 2002). According to Baker and Mehmood, (2015) the concept of social capital has gained attention within the organizational studies in the 1990s, due to the growing awareness of various organizations and nations worldwide to the value of social capital that involve social integration and interaction and subsequently give a significant impact towards new innovation and social well-being. Based on the RBV theory, resources that are valuable, difficult and costly to imitate by competitors, unique, and no substitute (Barney, 1991; Amit & Schoemaker, 1993) provide organization with dynamic capabilities. Consistent with the previous statement, Bolini et.al., (2002) asserts that organization with high level of social capital are likely to be more successful and gained extra competitive advantage as compared to organization with a lower levels of social capital. They also highlighted high quality of relationship between actors and long standing collaborative networks are considered as valuable, inimitable and unique resources which may give a sustainable competitive advantage to the organization. To explained, Yli-Renko et.al., (2001) and Zahra and George (2002) assert that high level of social capital i.e. when they know, trust and understand one another; help creates an effective and efficient working environment among organization members. This situation is said reduce barriers to knowledge resource exchange within an organization and help ease the process of acquiring new knowledge resource in the social

collaborative network structure (Vega-Jurado et.al., 2008). Thus, this new knowledge resource gained from various actors with the high level of social capital act as a novel solution in order to create new innovation into products, processes or services. In contrast, according to Sabatini (2009), high level of social capital could also bring negative outcomes for organization in general. For example, high level of social capital may encourage organization actors to pursue their specific narrow interest rather than given emphasis on contributing towards organization and society well-being as a whole. As for Narayan and Cassidy (2001) they argued that corruption and cronyism is the negative outcomes of high level of social capital which derived from *'powerful strong ties within tightly knit social group*' within political and government institutions.

From current knowledge-led economic perspectives, social capital can be seen as an important outcome for various organization and nation worldwide (Oh et.al., 2004). Ahuja (2000) and Sabbatini (2009) assert that social capital outcome creates a new inimitable knowledge resource that can be embedded into new products, services and processes and subsequently improves social well-being, enhance economic development and technological aspects. According to Cunha and Benneworth (2013), this can be achieved through socially innovative practices within social structure. Social structure as a platform facilitates and guide actor's action in order to leveraged knowledge resource and capabilities possessed by individuals and organization, aimed at creating new innovation and to enhance social value (Lochner et.al., 1999; Burt, 2000). Tsai and Goshal (1998) describe social structure as a dynamic social resource. Moreover, social capital creates a set of unique knowledge resource within collaborative network that enhance creative capacity thinking through the integration and interaction of various individual and organization (Caulier-Grice et.al., 2012). To elaborate further, social capital can also be explained through the concept of Community of Practice

(COP) (Lesser & Prusak, 1999). Studies by Lave and Wenger (1991) is regards as the pioneer to the concept of COP. COP is defined as a flexible group of professionals, informally bound by common interests who interact through interdependent tasks guided by a common purpose thereby embodying a store of common knowledge resource (Jubert, 1999). Members of COP are said to be informally bound by the social values they find in learning and engaging together in informal discussion to help each other resolve problems (Kakabadse et.al., 2003). Therefore, in essence, university-industry-community partnership and other special interest network and collaboration could be considered to be COP. Moreover, COP require resources such as time to formulate and maintain relationship and organizational environments conducive to learning (Kakabadse et.al., 2003; Krishnaveni & Sujatha, 2012). Hence, the members in COPs are based on mutual trust, benefits and values and in line with the concept of social capital (Bolisani & Scarso, 2015).

Within the literature, conceptual and empirical studies by researches revealed few determinants associated with social capital. For example early studies focus on the dimension of social capital itself as the determinant of social capital. Glaeser et.al., (1999), in his research examining trust and trustworthiness and social ties as the determinant of social capital. They found that the dimensions of trust and trustworthiness and social ties enhance social capital within collaborative networks. Furthermore, later study by Berggren and Jordahl, (2006) also examining determinant of trust and social ties within various economic institutions in Sweden. By using economic freedom index, they highlighted in their study, legal structure and security of property rights is the elements that enhance trust and social ties and thus have a significant positive relationship with social capital. More recent empirical studies also show that dimension of trust and social ties are associated with social capital. For example Beccera et.al., (2008) in their study highlighted when members have mutual trust and

reputation among them, it decrease opportunistic behaviour, cultural differences, minimise conflicts and subsequently creates high level of social capital. However, if members within the social structure are perceived as untrustworthy it may create low level of social capital (Maurer, 2010). A conceptual study by Leana and Van Buren (1999), shows that employment stability has significant positive effect on social capital. Their study found that elements of compensation, rewards and job security enhance the value of social capital within organization. Furthermore, Bolino et.al., (2002) exploring on the organization citizenship behaviour as the determinant towards enhancing social capital. The conceptual study found that organization citizenship behaviour that consist the elements of loyalty, obedience and social participation have a positive relationship with social capital. To elaborate further, the study asserts that cooperation, selflessness and involvement are the factors that increase the level of trust, affect and shared understanding among members within the organization.

Within the literature, social capital has also been found to aid knowledge management activities within and across organization boundaries (McFadyen & Cannella, 2004; Inkpen & Tsang, 2005; Hoffman et.al., 2005). Surprisingly, many empirical studies focus in adapting social capital as the process rather than outcome in the aspect of knowledge management activities (Newell et,al., 2004; Alguezaui & Filieri, 2010; Martinez-Canas et.al., 2012). To elaborate further, Tsai and Goshal (1998) discussed in depth on the importance of social capital as an outcome towards value creation and new innovation. Moreover, according to Widen-Wulff and Ginman (2004), social capital and knowledge management is being used overlap as a process and outcomes. However, they highlighted that social capital as an outcome of knowledge management is said more appropriate as compared to process. Social capital as an outcome could yield long-term benefits in terms of new innovation and actor's well-being. Therefore, this study uses workplace innovation, organization innovation and

social capital as the dimensions of social innovation. Moreover, the uses of the three dimensions of social innovation help to demarcated the broad concept and measurement of social innovation and enhance the precise focus in measuring social innovation. The aim of this study is to examine and explore social innovation in relations to the strategic knowledge management processes, particularly in the context of university-industry-community partnership. This is the aims of this study. Next section will present and discussed on the strategic knowledge management and its dimensions.

## 2.2 Strategic Knowledge Management

According to Nonaka (1991), in an economy where the only certainty is uncertainty, the one sure source of lasting competitive advantage is knowledge resource. The discussion on knowledge resource has initially started in the minds of philosophers since the era of classical Greek and has led to many epistemological debates (Alavi & Leidner, 2001). The earliest debates on knowledge resource come from Plato in 369 BC and Aristotle in the 1st Century (Fernie et.al., 2003). Plato (369 BC) introduces the idea of knowledge resource is neither perception, true judgement and nor true judgement, while Aristotle (1st Century), describe knowledge resource as 'what is present when knowledge is present and how ignorance occurs when knowledge is absent' (Drucker, 1993). This fuzzy definition has laid the foundation to the modern philosophers in trying to understand and define the nature of knowledge resource. John Locke in 1690 and Emmanuel Kant in 1781 deepen into trying to understand and define knowledge resource (Harding, 1991). The former stated that all humans are born without knowledge resource and only gain knowledge resource overtime through experience. In contrast, the latter argues that individual's mind is not a blank slate and it contained empirical and analytical knowledge resource. Furthermore, Kant explained that knowledge resource does not exist in the outside world but is created by the individual mind (Kuhn, 2010). The

debate and discussion of knowledge resource continue to grow among philosophers until the 20th century. This as a result had established a formal and organised definition and deepens understanding of knowledge resource due to the increasing interest on knowledge resource among philosophers (Nonaka & Nishiguchi, 2001). Notable 20th century philosophers such as Gettier (1963), Lehrer and Paxson (1969), Chisholm (1973) and Audi (1980) defined knowledge resource as truth, belief and justified. To elaborate further, truth condition refers to the idea or suggestion must be true and captures the key element of knowledge resource. Belief condition refers to the idea or suggestion which must be believed by the individual and justified refers to the idea or suggestion must have justification. In conclusion, the three criteria must be fulfilled in order to define knowledge resource. Furthermore, in understanding the nature of knowledge resource, Audi (1980) argues that knowledge resource is a distinctive structure, whereby a false belief cannot be considered as knowledge resource. This statement is supported by Pritchard (2006) stating to have knowledge resource, one's success must be genuinely being the result of one's efforts rather than merely by chance or luck. In other aspects of understanding knowledge resource, Chisholm (1973) describes perception, testimony, reason and memory as a four basic sources of knowledge resource. In addition, Pritchard (2006) highlighted perception and reason is the source of generating knowledge resource while testimony and memory is the source of preserving knowledge resource.

The above paragraphs have highlighted the origin discussion of knowledge resource within the context of philosophy and epistemology literature which summarised the nature and concept of knowledge resource as far back as before century. Knowledge resource exists from various aspects, dimension, sources and appearance and it is described as a multifaceted phenomenon (Allee, 1997; Audi, 2013). Understanding the very nature and concepts of

knowledge resource is important as it laid down the foundation to understand knowledge resource in any aspects and disciplines (Steup, 2009). In recent decades, the debates and questions about knowledge resource had entered into a much larger and important discourse and not only limited into discussion on understanding the nature and definition of knowledge resource. To elaborate further, the above statement refers to the rise of knowledge based in economic perspective and also factors such as global competition, rapid technological change, shorter products life cycles (Bartlett & Ghoshal, 2013; Meihami & Meihami, 2014). The most recent is the impact of knowledge resource as a new and novel solution in order to achieve social innovation towards improving social, economic and technological growth (Lizuka, 2013). These factors has led to the recognition of knowledge resource as the new foundation and prerequisite of economic development, job creation and social prosperity (Atasu et.al., 2009). As a result, these developments have changed the debates and discussion of knowledge resource among academicians, practitioners and governments worldwide into more real and pressing issues (Steenkamp & Kashyap, 2010; Den Berg, 2012).



The concept of knowledge in economy is based on the earliest definition of knowledge resource made by the notable 20th century philosophers in the earlier paragraphs of this section. Management scholars among others, Huber, (1991) and Nonaka (1994) describe the concept of knowledge in economy as a justified personal belief. Specifically, Nonaka and Takeuchi, (1995), Davenport and Prusak, (1998), Martensson, (2000) and Bender and Fish, (2000) indicates the concept of knowledge resource in economy is being discussed in three aspects namely; Types of knowledge resource, characteristics of knowledge resource and the chain of knowledge resource flows. The rationale behind understanding the concept of knowledge resource in economy is to have a clear understanding in order to examining strategic knowledge management processes within the context of university-industry-

community partnership. The types of knowledge resource are identified by the early work of Polanyi in 1967. In his work, Polanyi (1967) identified and distinguished between the two types of knowledge resource namely; tacit and explicit knowledge resource. According to Polanyi (1967), tacit knowledge resource is muted, inarticulate and cannot be explained. Due to the above nature of tacit knowledge resource, Polanyi (1967) coined the phrased 'we know more than we can tell'. To elaborate further, tacit knowledge resource embedded in the minds of individual's and either impossible or difficult to articulate. Tacit knowledge resource is subjective in nature and it comes from intuitions, values and hunches and developed through experience (Nonaka & Takeuchi, 1995).

Accordingly, tacit knowledge resource cannot be expressed in words, sentences or formulas and it includes technical skills such as craft and know-how (Jasimuddin et.al., 2005) . In contrast, explicit knowledge resource refers to knowledge resource that is transmittable in formal and systematic language and can be captured in tangible form such as words, formulas, documents and database (Nonaka, 1994; King, 2009). Table 2.2 shows the distinction between tacit and explicit knowledge resource.

Table 2.2
*Tacit and Explicit Knowledge Resource*

| **Characteristics** | **Tacit Knowledge** | **Explicit Knowledge** |
|---|---|---|
| Content | Non-codified | Codified |
| Articulation | Difficult | Easy |
| Location | Human Brains | Computers, artefacts |
| Communication | Difficult | Easy |
| Mode of transfer/ Diffusion | Face-to-face contact, storytelling | Information technology and other archives |
| Storage | Difficult | Easy |
| Strategy | Personalisation | Impersonalisation |
| Ownership | Organization and its members | Organization |

Source: Adapted from Jasimuddin et.al., (2005)



From table 2.2, tacit knowledge resource in particular is complex in nature. However, the literature suggests that tacit knowledge resource is an inimitable competitive advantage (Spender, 1996). The critical element of organization to sustained competitive advantage is the ability to leverage and integrate the specialization of tacit knowledge resource from individuals (Nonaka, 1994). According to Nonaka and Takeuchi, (1995), in reality the two types of knowledge resource are not clearly defined. A study by Kogut and Zander (1992) found that all knowledge resource can have both tacit and explicit component and should not be seen as two separate types of knowledge resources. It is an extremes continuum of tacitness and explicitness between the two knowledge resource (Jasmimuddin et.al., 2005). Hence, both knowledge resources should be well understood and also on the impact it has on how it flows within the strategic knowledge management processes i.e. knowledge creation, knowledge transfer and knowledge application; particularly in the university-industry-community partnership.

Various management scholars investigated on the issue of tacit knowledge resource, among others; a study by Simonin, (2004) and Coff et.al., (2006), investigated on how to disseminate tacit knowledge resource effectively within the organization structure. These studies indicate that tacit knowledge resource can best be transferred through social interaction and direct communication between source and recipient of knowledge resource. Furthermore, social networks interactions have a higher tacit component of knowledge resource and it is valuable for the competitive knowledge resource. The findings of the study expand the statement pointed out earlier by Nonaka (1994) that social networks interactions have higher tacit component of knowledge resource and it is referred as ontological dimension. In addition, social networks interactions are crucial element for leveraging new tacit knowledge resource. Study by Hoetker and Agarwal (2007) defined explicit knowledge resource as a public knowledge which refers to knowledge resource that is transmittable in formal and systematic language. On the other hands, tacit knowledge resource is defined as private knowledge which consists of experience, value and belief. Furthermore, both author highlighted tacit knowledge resource is 'sticky' due to the ambiguity and highly embedded of innovation knowledge resource in the individual human capital.

Within the literature the characteristics of knowledge resource is not clearly defined and ambiguity exist based on the broad and general explanation of what characteristics of knowledge resource is actually means (Martensson, 2000). To eloborate further, many authors have taken a broad and general view when explaining the characteristics of knowledge resource. A review of the literature found that the characteristics of knowledge resource is being simply defined as scattered, messy, self-organize, it seek community and easy to lose by its nature (Mayo, 1998). Similarly, it can be argued that the blurry meaning of knowledge resource characteristics such as knowledge is slippery, knowledge travels on language,

knowledge resource is a social phenomenon and knowledge resource does not grow forever, is too difficult to be well understood (Steyn, 2004). In contrast, despite of the ambiguity in understanding the meaning of characteristic of knowledge resource, there is a few well-placed description of knowledge resource characteristic within the literature. Gopal and Gagnon, (1995) and Schaefer, (1998) highlighted, knowledge resource is something that resides in people's minds rather than in computers. It is affected by individual's belief, experiences and attitudes and it is not coded, audited, inventoried, and complied for employees to use as needed. Table 2.3 presents examples of various characteristics of knowledge resource that exist in the literature.

Table 2.3
*Characteristics of Knowledge Resource*

| Authors | Characteristics |
|---|---|
| Allee (1997); Mayo (1998) | Knowledge resides within individual, scattered and looseness in nature. |
| Gopal and Gagnon (1995) | Knowledge resides within individual's mind and difficult to access. |
| Galagan (1997) | Knowledge is difficult to stored and retrieved when it is needed. |
| Kirchner (1997); Schaefer, (1998); Davenport et.al., (1998) | Knowledge involves the transformation of data and information which affected by subjectivity of experience, values, beliefs and interpretation of individuals. |

Source: Adapted from Martensson, (2000)

Interestingly, Reed and DeFillippi (1990) and Zander and Kogut (1995) discussed the issues of knowledge resource characteristic based on the concept of causal ambiguity. They refers

knowledge resource characteristic as a set of causal ambiguity which consist of complexity and specificity. They argue that complexity of knowledge resource characteristic arises from deep integration and interdependence on organization routines, technologies and individual. Moreover, specificity refers to the uniqueness and idiosyncratic nature of knowledge resource that leverage from investment and R&D activities. Therefore, it is important to have a better understanding on the characteristics of knowledge resource and the implications towards strategic knowledge management processes. Another aspect of understanding the concept of knowledge resource in economy is the chain of knowledge flow. The chain of knowledge resource flows refers to distinction between data, information and knowledge (Bender & Fish, 2000). Fahey and Prusak (1998) stated, if knowledge resource is not something that is different from data and information, then there is nothing new or interesting about knowledge resource. According to Alavi and Leidner (2001), the issue has formed an epistemological debate within the literature and evidently knowledge resource is viewed as the same as information and data and sometimes being used interchangeably. Court, (1997) and Davenport and Prusak, (1998) suggest that the distinction between data, information and knowledge must be addressed in order to show the explicit differences between them.

A study by Bell (1999) has provides the distinction between data, information and knowledge resource. The author describes data as an ordered sequence of given items or events, information is a context-based arrangement of items, and knowledge resource is the judgement of the significant of events and items which comes from the particular context. In different view, Tuomi (1999) describe knowledge resource must exist before information can be formulated and before data can be measured to form information. Alavi and Leidner (2001) highlighted a commonly held view is that data is raw numbers and facts, information is processed data and knowledge resource is authenticated information. In addition, both authors

argue that the hierarchy from data to information and to knowledge resource involves dimension such as context, usefulness and interpretation. The important issue is to distinguish between information and knowledge resource. Critical to this argument, information is converted to knowledge resource once it is processed in the mind of individuals and knowledge resource becomes information once it is articulated and presented in the form of text, graphics and words. Figure 2.0 explained the hierarchy of knowledge resource.

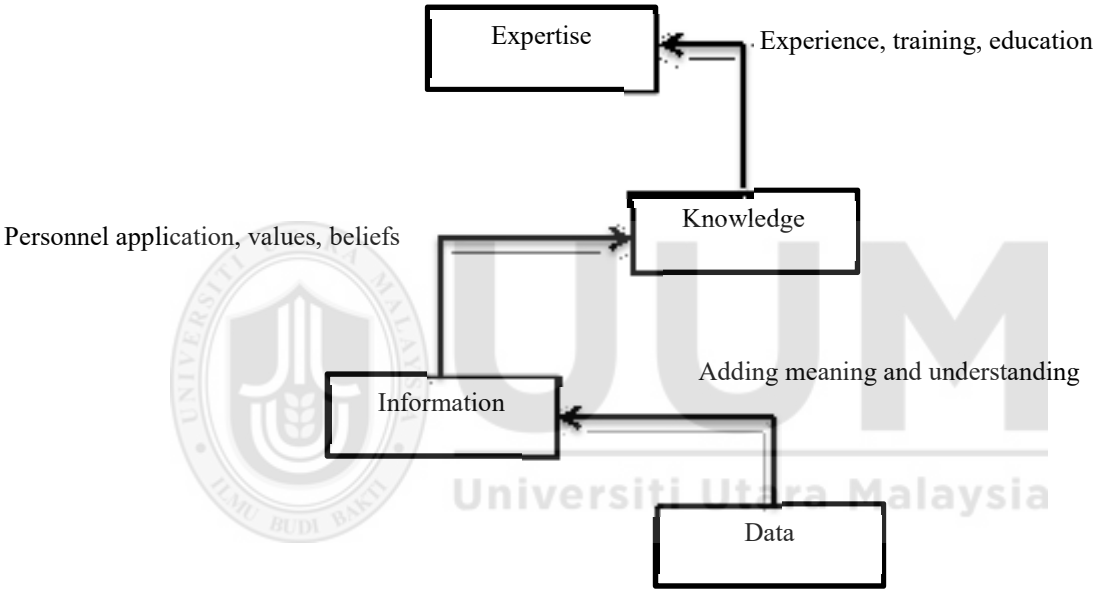



Figure 2.0
*Hierarchy of Knowledge Resource*
Source: Adapted from Bender and Fish (2000)

From figure 2.0, data are discrete and is viewed as a primarily raw material for the creation of information. Data becomes information by adding meaning and understanding. Knowledge resource is the application of information. Information becomes knowledge resource by transforming personal application, values and beliefs. Bender and Fish (2000) argue that knowledge resource can be enhanced into expertise by enrichment through experience, training and education. The hierarchy of knowledge resource which involves data, information, knowledge and expertise is bi-directional process. According to Nonaka and

Takeuchi (1995) and Bender and Fish (2000), knowledge resource can be broken down into information and information can then be broken down into data. This process allows individuals to transfer information and data. In contrast, Fahey and Prusak (1998) and Bender and Fish (2000), argue that knowledge resource and expertise is difficult and cannot easily transferred to another person. This is due to the knowledge resource and expertise is created in the head of individual. Tsoukas and Vladimirou, (2001) suggest that individual or knowledgeable person can transfer data and information, but the knowledge resource itself has to be created, integrate and frame within the context of their experience, expertise and judgement. The types, characteristics and the chains of knowledge resource will aid a better understanding to the actors involves in the strategic knowledge management processes within the context of Malaysian university-industry-community partnership.

Although many advantages are brought by the used of knowledge resource in the economy, managing knowledge resource is rather difficult because it fraught with challenges (Gourlay, 2006; Nonaka & Von Krogh, 2009). Martensson, (2000) argued that the main issue concerning knowledge resource is on how to manage it successfully as it is extremely challenging. From the previous statements, Matzler and Mueller, (2011) stated that managing knowledge resource involves a lot of process such as creation, transfer and application in order to achieve new innovation, competitive advantage and contribute towards social well-being. As a result, literature highlighted strategic knowledge management processes is being implemented by organization in order to manage knowledge resource successfully (McAdam & McCreedy, 1999). Strategic knowledge management in general has comes into existence from both academics and practitioners in the 1990s (Kakabadse et.al. 2003). Many management researchers among others Nonaka, (1991); McCambell et.al., (1999) and Alavi and Leidner, (2001) pointed out strategic knowledge management activities had been started

within the private company as a result of many private organizations incapability to identify, locating, maintaining and leveraging knowledge resource from within and across organizational boundaries. These weaknesses have led to a systematic attempt to manage knowledge resource by organization.

A study by DiMattia and Oder (1997) found that the empirical origins and growth of strategic knowledge management has emerged from two fundamental transitions such as organization downsizing and technological development. Their study explained that in 1980s organizations used downsizing as the popular strategy to reduce overhead and increase profits. However, the downsizing strategy appeared to be disadvantage to the organization which results to a loss of important knowledge resource. Piggot, (1997) elaborate when employees leaved the organization, they took the knowledge resource with them. This had resulted organization loss significant amount of valuable knowledge resource. This circumstance has led organization to review and undertake the new strategy of knowledge management in an effort to protect valuable knowledge resource and retained knowledge workers for organization future benefits. As for technological development, DiMattia and Oder (1997) describes, the development of information technology has affected both individual and organization and strategic knowledge management activities are seen as a mechanism in an attempt to tackle the issue of explosion of information in such a way to increase organization knowledge. In addition, the emerging of technological development enables global sharing information within and across organizations and can serve as a tool to leverage knowledge resource more effectively (DiMattia & Oder, 1997). The definition of strategic knowledge management is many and varied within the literature. Despite that, all management scholars agreed that the underlying concept of strategic knowledge management is the essence of organization ability to create, transfer, integrate and exploit knowledge resources resident in the organization for

the benefits of organization itself, customers and shareholders (Inkpen, 2000; Alavi & Leidner, 2001). Moreover, strategic knowledge management has been found to improve the performance of knowledge exploration and exploitation activities (March, 1991; Bierly et.al., 2009) and increases organization innovation ability in response to market changes (Leng & Shepherdson, 2000). Hedlund (1994) and Beckman (1999) suggest that strategic knowledge management addresses the process of generation, representation, storage, transfer, transformation, application and protecting knowledge resource in an organization and subsequently creating new innovation, capabilities and superior performance. Alavi and Leidner (2001) describe strategic knowledge management as a systematic and organizational specified process for acquiring, organizing and communicating both tacit and explicit knowledge resource of employees so that other employees may make use of and become more effective and productive in their work. The working definition of strategic knowledge management according to James (2004) is the identification, acquisition, utilisation, support, maintenance and disposal of knowledge assets for the purpose of adding value and benefiting all stakeholders.



In general term, Davenport and Prusak, (1998) describe strategic knowledge management as getting the right knowledge to the right person, at the right time and in the right format. Furthermore, Davenport and Prusak (1998), asserts that most of the strategic knowledge management processes aiming at making knowledge resource visible and also identify the important roles of knowledge resource towards developing knowledge-intensive culture within the organization. To elaborate further, Nonaka and Takeuchi, (1995) explained knowledge intensive culture can be achieved by encouraging knowledge resource sharing, actively seeking and offering knowledge resource between employees and having organization that supportive of building knowledge resource infrastructure. Therefore,

strategic knowledge management is thought to be a potential catalyst for new innovation and performance within the organization.

There have been various strategic knowledge management processes models that describe the relationship of the key processes of strategic knowledge management within the literature (Davenport & Prusak, 1998). Strategic knowledge management is about managing knowledge-related assets which include tacit and explicit knowledge resource that is embedded within individuals, processes, products and relationship (King, 2009). Effective strategic knowledge management processes can greatly facilitate organization efficiency and effectiveness and increase responsiveness to market changes (James, 2004). Furthermore, for Davenport et.al., (1992) and Martensson, (2000), the ability of organization to deal effectively with the strategic knowledge management processes can improve organization innovation i.e. product development and quality which is the key aspect of competitive advantage (Carneiro, 2000). The review of the literature revealed that the process of strategic knowledge management involves many processes. These processes are among other knowledge creation and acquisition, knowledge refinement and storage, knowledge transfer and sharing and knowledge resource application and utilization (McCampbell et.al. 1999; King, 2009). For Alavi and Leidner (2001), strategic knowledge management processes is largely regarded as a process involving four basic processes, namely creating, storing, transferring and applying knowledge resource. According to Meier (2011), strategic knowledge management processes is using varying term of knowledge processes. The statement is argued by Alavi and Leidner, (2001) by stating strategic knowledge management processes only differs in terms of number and labelling of the processes rather than underlying concepts.

In line with the above paragraph, a study by Gold et al., (2001) identify strategic knowledge management processes involves acquisition, conversion, application and protection as the main elements of strategic knowledge management processes. Turner and Makhija (2006) identified acquisition, restoration, transfer and utilization as the elements of strategic knowledge management processes. Furthermore, in recent study by Meier (2011), indicates knowledge creation, knowledge transfer and knowledge application as the main processes of strategic knowledge management. In general, a number of studies by Inkpen and Beamish (1997), Steensma and Lyles (2000) and Tsang et.al., (2004), Jiang and Li, (2009), Meier (2011) and Audretsch and Caiazza, (2015) highlighted strategic knowledge management processes creates three prominent themes 1) Knowledge Creation and 2) Knowledge Transfer and 3) Knowledge Application. To elaborate further, knowledge creation is associated with the development of new knowledge resource (Nonaka & Takeuchi, 1995; Gourlay, 2006), knowledge transfer refers to the transmission process whereby knowledge resource is transferred within or across organization boundaries (Argote & Ingram, 2000); and knowledge application is describes as how such knowledge resource is embedded and applied to create value and competitive advantage (Grant & Baden-Fuller, 2004). Therefore, it is important to understand the three key processes of strategic knowledge management namely creation, transfer and application exists within and across organization boundaries and particularly within the university-industry-community partnership.

### 2.2.1 Previous studies on Strategic Knowledge Management Processes dimensions

This section presents previous studies investigating strategic knowledge management processes namely: knowledge creation, knowledge transfer and knowledge application.

#### 2.2.1.1 Knowledge Creation

The work of knowledge creation within the organization is catalyst by the successful of Japanese organizations throughout the 1980s and 1990s. The key contributor of knowledge creation model in the management literature is pioneered by the notable work of Nonaka and Takeuchi (1995) as established in their SECI Model. This statement is supported by Chittoo et. al., (2010) by stating a discussion of knowledge creation will be lacking if it does not consider the contribution of Nonaka and Takeuchi (1995) SECI model. Nonaka and Takeuchi (1995) highlighted that when economic market shift, competitors will increase, product will obsolete and technology will proliferate, causing an organization to rely on knowledge resource in order to stay competitive and innovative. Therefore, knowledge creation is regards as fundamental processes of strategic knowledge management in which individuals create new knowledge resource in order to apply into organization products, processes and services (Nonaka & Von Krogh, 2009). A study by Von Krogh, (1998) and Nonaka and Von Krogh (2009) highlighted that successful organization is those that consistently create new knowledge resource and know-how. From the previous statement, Nonaka and Takeuchi (1995) identified four patterns of knowledge creation of how organization creates knowledge continuously. These four patterns involve a circle processes or what they term as spiralling which converts tacit and explicit knowledge resource. The patterns are exploited in four stages known as socialization, externalization, combination and internalization. Figure 2.1 illustrated the SECI model.

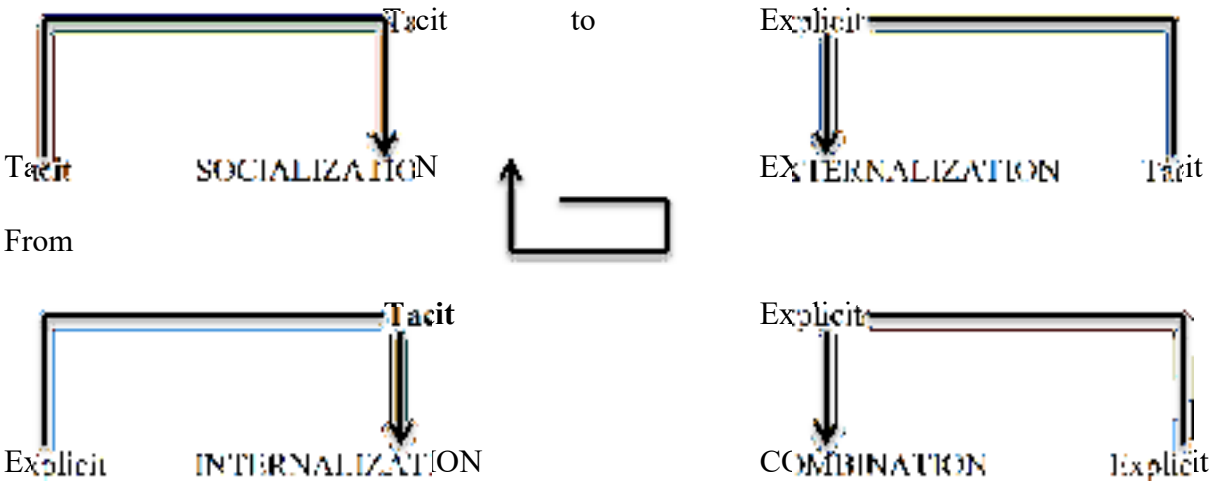



Figure 2.1
*SECI Model*
Source: Adapted from Nonaka and Takeuchi (1995)

Based on figure 2.1, organizational knowledge resource is created through the continuous social interaction of tacit and explicit knowledge. The SECI model presents two important dimensional known as epistemological dimension (i.e. explicit knowledge) and ontological dimension (i.e. tacit knowledge). Socialization mode refers to conversion of tacit to tacit. Socialization is the process of conversion new tacit knowledge resource through individuals shared experience, observations and imitations. New knowledge resource from socialization mode can be achieved through learning from hands-on experience, informal social meeting and interactions with others within and outside organization (Nonaka & Takeuchi, 1995). Externalization mode refers to conversion of tacit knowledge to explicit knowledge resource. Within this mode, new knowledge resource is created through formalising the tacit knowledge source such as experience, intuition and self-values i.e. craft and know-how (Chatti et.al., 2007) into comprehensive forms that can be understood by others (Nonaka & Konno, 1998). According to Nonaka et.al., (2000) when tacit knowledge is being convert to explicit knowledge by formalizing it through documentations, manuals and database, the new knowledge resource is said being crystallised. Furthermore, example of new knowledge

creation of externalization mode is the concept of new product development and quality control (Nonaka et.al., 2000). Within the externalization mode, high degree of commitment from individuals is needed where it involves open dialogue, analogies and models (Andreeva & Ikhilchik, 2011).

Combination mode refers to conversion of explicit knowledge to explicit knowledge. This mode involves the process of converting new explicit knowledge by combining with the existing explicit knowledge within the organization (Arif et.al., 2009). According to Nonaka et.al., (2000) new explicit knowledge resource is collected from within and outside the organization and then combined, edited and process to form a new tacit knowledge resource and transferred widely in the organization. The newly created explicit knowledge resource under this mode can be stored and excess (Chatti et.al., 2007). The use of information technology is essential in this mode for the purpose of sharing the new explicit knowledge resource created to the intended recipient within the organization (Panahi et.al., 2012; Chatti et.al., 2007). Internalization mode refers to conversion of explicit knowledge to tacit knowledge. Explicit knowledge can be transferred into tacit knowledge of an individual and organization through learning by doing i.e. translating theory into practice (Nonaka et.al., 2000; Miller, 2012). In internalization mode, organization policy that supported sharing of explicit knowledge in the form of on job training programmes, organization manuals and jobs description and experiments and simulations allows individual to internalised and increased its tacit knowledge in the form of mental model and technical know-how and becoming a new superior tacit knowledge resource for organization (Andreeva & Ikhilchik, 2011).

However, despite the widespread acceptance of SECI Model, interestingly Gilsby and Holden (2005) argue that the model is not transferable since it was formulated based on Japanese

management cultural practises which differs from other culture. Apart from that, the SECI model only considered knowledge resource existing at an individual level. This however, led to further improvement of SECI Model. Nonaka and Konno, (1998) counter the criticism by highlighted that managers need to provide necessary context for individual to share and create knowledge resource in the organization. The introduction of the concept of 'Ba' which refers to a shared space for knowledge activities had enhanced and promoted employee socialization and knowledge sharing within the organization, which in turns help to foster innovation. Another critic on SECI model is raised by Gourlay (2006), who examined on conceptual organizational knowledge creation. The author argued that the four modes of interaction of tacit knowledge and explicit knowledge in SECI model are flawed. Three modes of interaction such as socialization, externalization and combination are plausible but are not supported by simple evidence. Internalization mode in the other hand, appears to be difficult to understand and unconvincing as to how knowledge resource is created. In addition, the author also argued that the SECI model by Nonaka and Takeuchi (1995) ignore the fundamental element of tacit knowledge.



Thus, this study will used socialization, externalization, combination and internalization as the dimensions for knowledge creation in the context of Malaysian university-industry-community partnership in contributing towards social innovation. Next section will discuss on knowledge transfer process.

#### 2.2.1.2 Knowledge Transfer

The literature has multiple definitions of what is meant by knowledge transfer. Argote and Ingram, (2000) defined knowledge transfer as the process through which one unit for example an individual, group, department, division or organization is affected by the experience of

another. They further assert that the effectiveness of knowledge transfer can be observed through the changes of knowledge resource or performance of the knowledge recipients. Szulanski et. al., (2004) also look specifically at the knowledge recipient. They defined knowledge transfer as the transmission of a message from a source to the recipient in a given context. The knowledge resource is then absorbed and improves the behaviour and performance of the knowledge recipient. Kumar and Ganesh (2009) refers knowledge transfer as an activity that specifically refers on exchanging two knowledge resource i.e. Tacit and Explicit knowledge between the two agents. The two agents refers to the individual, team or an organization (Joshi et.al., 2007). Furthermore, knowledge transfer involves two actions: 1) Transmission (source of knowledge to the potential recipient); 2) Absorption (recipient receives, absorb and apply the knowledge) (Davenport & Prusak, 1998). Thus, if knowledge resource has not been transmitted, absorbed and being applied, it has not been transferred (Sheng et.al., 2013). In addition, even transmission and absorption are meaningless in the context of knowledge transfer, if the new knowledge resource does not lead to changes in behaviour and performance of an organization (Steensma & Lyles, 2000).

From the aforementioned paragraph, Liyanage et.al., (2009) acknowledge the issue on what they term as 'knowledge loss' and knowledge discontinuity' and has improved the understanding of knowledge transfer process as to identify, access and to acquire the knowledge resource through knowledge transfer process for the purpose of transformation and application of knowledge resource in order to creates new ideas and solution that can improved or enhance products, processes and services. Thus, knowledge transfer is about communication and transformation as well as absorption capabilities in order to make things more efficient and effective within the organization. Within the literature, many management authors refer the act of communication and transformation as the dimensions of knowledge

transfer (Zander & Kogut, 1995; Gilbert & Cordey-Hayes, 1996; Argote & Ingram, 2000; Gherardi & Nicolini, 2000; Todorova & Durisin, 2007; Liyanage et.al., 2009). Knowledge communication is described as the action or process of transporting and also as a conveyance of new knowledge resource from sender to receiver (Liyanage et.al., 2009). To elaborate further, knowledge communication between the sender and receiver not only involve human being i.e. individual and networks individual, but it also involves through non-human physical structure i.e. tasks and tools (Argote & Ingram, 2000). From the previous statement, Gilbert & Cordey-Hayes, (1996) asserts that knowledge communication can be in the form of verbal and written. Argote and Ingram (2000) and Harada (2003) explained that individual and networks individual communicate with each other through face to face communication, observation and cognitive learning to transport and convey tacit and explicit knowledge which involve knowledge communication at individual, group, department and also external organization level. Moreover, task and tools is a written form of knowledge communication. Task refers to organizational structure, procedures and practices and goals, while tools include technological components such as hardware and software (Reagans & McEvily, 2003). Argote and Ingram (2000) highlighted, within the context of task and tools, knowledge communication occur without the presence of human in order to transport and convey knowledge resource from sender to the receiver. For example, the used of task and tool that has been modified and already embedded with superior knowledge resource by sender to individual, group, department and external organization receiver. According to Ko et.al., (2005) knowledge communication between individuals is a common process of transporting new knowledge resource from sender to receiver. Moreover, they suggest that sender must have communication encoding competence which refers to sender ability to express idea clearly, have a good command in language and easily understood whereas, communication decoding competence refers to recipient ability to listen, be attentive and respond quickly.

Within the literature, another dimension that is reflected and intersecting with knowledge transfer is said to come from knowledge transformation (Gherardi & Nicolini, 2000; Zahra & George, 2002; Todorova & Durisin, 2007). According to Yakhlef and Groupe (2007) knowledge transfer from sender to receiver implies the transformation of knowledge of both actors. According to Cumming and Teng (2003), regardless of the approach and setting, the objective of knowledge transformation is to transform new acquired knowledge resource from source to the receiver successfully. To elaborate further, Zahra and George (2002) describe knowledge transformation as a process of developing and refinement of previous knowledge resource within the receiver with the newly acquired knowledge resource from sender in order to create new innovation. According to Miller (2012), knowledge transformation is refers to the ability of both actors i.e. sender and receiver of knowledge, to leverage and convert external knowledge resource acquired by receiver and utilised it to creates new innovation. The purpose of knowledge transfer will be lost without internalise the way it will be used by the receiver. The internalisation process is known as knowledge transformation (Antonelli, 2000). According to Holden and Kortzfleisch (2004) knowledge transformation is the highly applicable analogy in exploring the nature of knowledge transfer. To elaborate further, Liyanage et.al., (2009) pointed out that knowledge transfer and knowledge transformation similarities can be categories in four aspects. Firstly, network activity where both processes involve wider networks of social process. Secondly, process and end product quality where both processes concerned with quality of products and the actual transformation process. Third, the level of accuracy where both processes concern with the level of accuracy of knowledge resource being transforms so that the receiver can fully utilised it and fourth aspect is the barriers on the production of smooth and good transformation of knowledge resource.

Moreover, Fontes (2005) highlighted knowledge resource from sender to receiver is fraught with various challenges such as the nature of the knowledge itself, sender and receiver institutional differences and also relational related factors that may lead to difficulties in transforming new knowledge resource into new innovation. In line with the previous statement, Partha and David (1994) also highlighted the complex, systemic, context related and tacitness of knowledge resource characteristic and also differences in scope and purpose between academic and industry knowledge resource requires high performance of knowledge transformation from both actors in order to turn newly acquired knowledge resource into viable technologies of products, processes and services. Thus, both sender and receiver of knowledge resource must have the absorptive capacity, motivation and prior knowledge in order to transform internal and external knowledge resource into new innovation (Lichtenthaler, 2009; Camison & Fores, 2010). From the above statements, knowledge communication and knowledge transformation can be considered simply explain knowledge transfer. Thus this study used knowledge communication and knowledge transformation as the dimensions of knowledge transfer. Within the literature, knowledge transfer is one of the most important process of strategic knowledge management in order to obtain superior knowledge resource from specialised knowledge domains that can improve organization learning and performance (Liyanage et.al., 2009). Monjon and Waelbroeck, (2003) and Brandstetter and Ogura, (2005), studies show that effective knowledge transfer within and across organization have a positive effect on organization's innovation and performance. Hence, understanding the process of knowledge transfer is vital for all actors to achieve the benefits of knowledge transfer. Furthermore, it is also vital to understand the process of knowledge transfer within the framework of strategic knowledge management processes. According to Cope et.al., (2009) and Ternouth et.al., (2012) the generic of model of good

knowledge transfer process in an open innovation consist of five main stages. Figure 2.2 show the five main stages of knowledge transfer process.

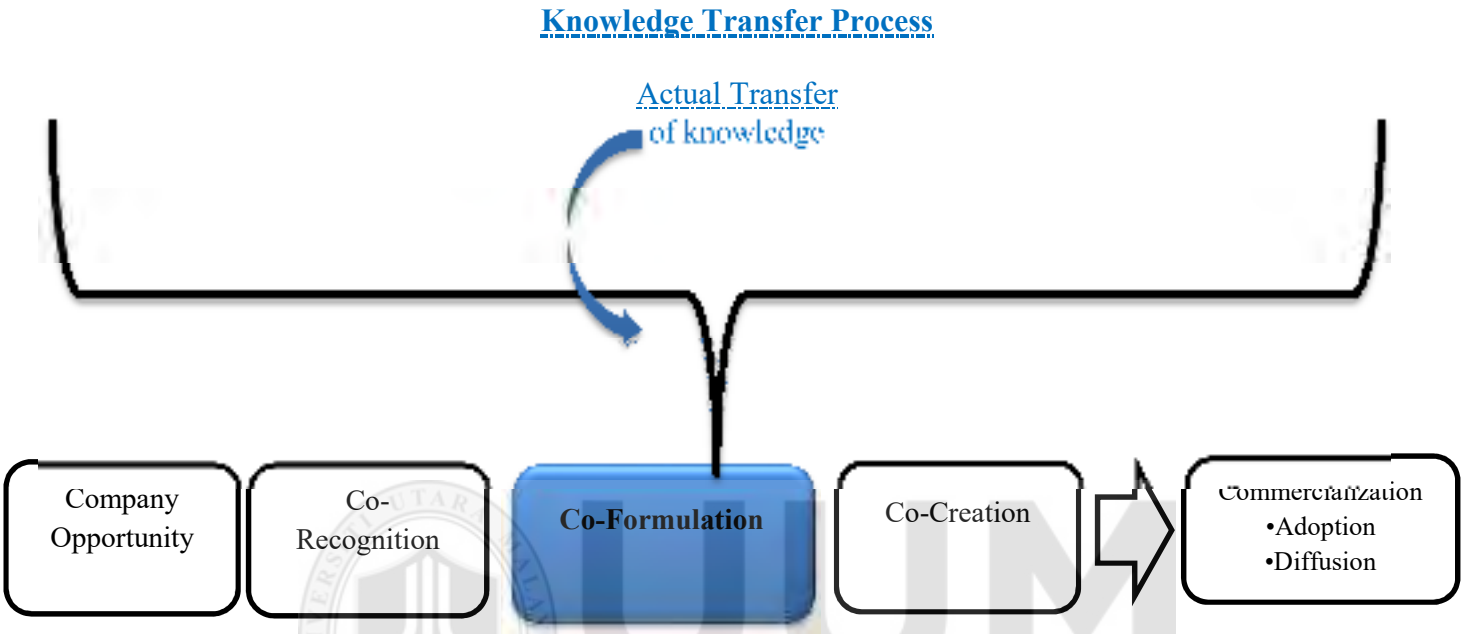



Figure 2.2
*Generic Model of Knowledge Transfer Process*
Source: Adapted from Ternouth et.al., (2012)

The generic model of knowledge transfer by Ternouth et.al. (2012) consist of five stages namely; Company opportunity, Co-recognition, Co-formulation, Co-creation and Commercialization in achieving new innovation. Referring to the figure 2.2, the first two stages is regards as the initial stages of the knowledge transfer process whereby actors began to recognise, understand and choose the right partner for the knowledge transfer partnership. This stage includes discussion on the awareness of potential successful innovation project, recognised the actors potential and also overcome the dissimilarities between actors. The third stage of the knowledge transfer process i.e. Co-formulation, this is the most vital stage where it involves the actual transfer of knowledge and knowledge acquisition between actors. This

stage requires those in the partnership to understand the routines, processes and information and also have the ability to transfer not only the explicit and codified knowledge resource, but also tacit knowledge resource. This can only be achieved through collaborative networks, assimilation and the building of trust among partners.The Fourth stages which Ternouth et.al., (2012) term as Co-creation is the implementation process. At this stage, the partners work to create the opportunity for innovation in products, processes and services. The success of this is dependent not only on the absorption of knowledge resource but also the ability of the actors to deliver. The fifth stage is the exploitation process. successful commercialisation is the end goal for the actors involved. Success in the market place is the mark of successful knowledge transfer and adoption by end users is the mark of successful innovation.

Furthermore, conceptual and empirical studies shows that knowledge transfer approach had received an enormous attention among academicians and practitioners (Jiang & Li, 2009; Foss, et.al., 2010). There is a wide range of literature within the context of knowledge transfer approach ranging from categories such as contributions of knowledge transfer and factors affecting knowledge transfer approach. The reason behind the growth of knowledge transfer literature is due to the more visibility and easier to observe as compared to knowledge creation and application. The study by Shane (2004) and O'Shea et.al. (2007) provide some empirical evidence to support the above statement. Both studies reveal that in R&D activities within university-industry-community partnership, knowledge transfer process almost immediately started. In contrast, knowledge creation and application to commercial ends requires development, testing and prototyping which involve the creation of starts-up and spins- off company, patenting and licensing. Knowledge application especially requires more time and cannot be immediately measurable (Meier, 2011). Past researches have shown that knowledge transfer of both internal and external sources has an important contribution

towards organization survival (Lyles & Salk, 1996). For example, Tsai (2001) found that knowledge transfer activities increased organizational performance. Within the literature, knowledge transfer also evidently helps to enhance innovation by generating new knowledge resource for new product development (Subramanian & Venkatraman, 2001). To elaborate further, studies conducted by Monjon and WaelBroeck, (2003) and Brandstetter and Ogura, (2005) shows that, effective knowledge transfers have a positive effect on organization innovation and performance. In addition, a study by Katila and Ahuja (2002) revealed that new product development depend upon the effectiveness and efficiency of organizational knowledge transfer. Moreover, studies by Contractor and Lorange (2002), Easterby-Smith et.al., (2008) and Huggins, (2010) describe knowledge resource from external source is proved to be more significant and central within the literature as compared to internal source of knowledge transfer. This factor is due to the factors such as globalization, limited expertise and resources and also difficulty to rely exclusively on in-house new knowledge resource (Hamel & Prahalad, 1994). The statement is echoed by Grant (1996), who states that it is impossible for organization to cope with generations of many types of knowledge resource by itself and no single organization has the full range of knowledge resource and expertise in order to create continuous new innovation and competitive advantage. Hence, the use of external knowledge resource expands organization knowledge based (Bettis & Hitt, 1995).

Evidently, studies by Menon and Pfeffer (2003) and Perez-Nordtvedt et al. (2008) on the effectiveness and efficiency of external knowledge transfer provide evidence that organization prefer to obtain knowledge resource from external sources. This is because external knowledge resource appears to be scarce, unique, valuable, rare and inimitability. Subsequently, Contractor and Lorange (2002) indicates that organizations are increasingly motivated in acquiring external sources of knowledge resource in order to gain market power

by reducing and sharing of risks and costs. However, Norman (2002) critics that although external knowledge transfer received much attention due to the aforementioned reasons, actors that involves tend to be more protective when it comes to the knowledge resource that they classified as superior and core i.e. tacit knowledge. This evidence was later explained by Becerra et.al., (2008) by highlighting when actors and organization views other partners as competitors and have the same capability and resources, it raised concern about inadvertent leakage of critical knowledge resource and expertise within the process of external knowledge transfer. Easterby-Smith et.al. (2008), argue that even though the mutual understanding of external knowledge transfer must be in a win-win scenario, it has been challenge by the concept of learning races where actors and organization that learn fastest will dominate and become more formidable competitors. Other critics about external knowledge transfer are concern with the nature and culture of the new knowledge resource which acquired from external organization. This debate is discussed by Van Wijk et.al., (2008) by explaining actors and organization is more likely to transfer and adapt knowledge resource that is relevant and can be understood in order to generate short term results. In summary, the literature identifies a number of possible benefits to organizations arising from knowledge transfer activities. Therefore, knowledge transfer process is very important to helps commercialised knowledge resource into technological advancement. The next section will discuss on knowledge application process.

#### 2.2.1.3 Knowledge Application

Knowledge application is another prominent theme of strategic knowledge management processes. Knowledge application refers to the process of applying internal and external knowledge into new products, processes and services in order to create value and achieve sustainable competitive advantage (March 1991). In line with the previous statement, Song

et.al., (2005) refers knowledge application as organization acting in a timely response to technological change by applying new knowledge resource generated into new product, processes and services. In the knowledge based literature, knowledge creation and knowledge transfer acted as a vehicle of learning in which organization members uses the partner to create and transfer knowledge based, while knowledge application is a form of exploration and exploitation of new knowledge resource created for the development of successful new products, processes and technology (Spender, 1996; Holmqvist, 2003; Grant & Baden-Fuller 2004). According to Ried et.al., (2001), accumulation of knowledge assets such as patents, new products and technology are the evidence of successful application of knowledge resource by the organization.

Within the literature, many management authors refer knowledge application as the application of exploration and exploitation (March, 1991; Gupta et.al., 2006; Miller et.al., 2006; Jansen et.al., 2006; and Bierly, et.al., 2009). The notion of exploration and exploitation is introduced by March, (1991). In his seminal work titled 'exploration and exploitation in organizational learning' highlighted organization needs to response to the intensity of competition and the fast pace of economic changes by exploring new knowledge resource and exploiting existing knowledge resource competencies. To elaborate further, exploration refers to the application of knowledge resource to produce new products, processes, services and technologies (Gupta et.al., 2006). In contrast, exploitation refers to the application of knowledge resource to refine the organization existing products, processes and services (He & Wong, 2006). Evidently, empirical studies also give some insight on the issues of knowledge application. Kang et.al., (2007) and Bierly et.al., (2009), describe knowledge application consists of two dimensions which refers to exploration and exploitation. Exploration is the application of knowledge resource to produce new products, processes and services while

exploitation is the application of knowledge resource to refine the organization's existing products and improve its process and services (March, 1991). Although knowledge resource from the processes of creation and transfer are vital to new innovation, exploration and exploitation is said to act as a central innovation component in the KBV theory (He & Wong, 2004). Literature has identified that knowledge application is the most underexplored outcome within the knowledge management processes (Meier, 2011). To elaborate further, recent researchers has highlighted the needs to undertake and examine the determinants of knowledge application and to understand on the ability of the organization to apply internal and external new knowledge resource into organization product, processes and services (Miller, 2012; Akbar & Tzokas, 2013). This statement is supported by Mitchell and Boyle, (2010); Miller, (2012) and Kotha et.al., (2013) by describing only few studies have systematically investigate the antecedents of knowledge application. This is disappointing given the importance of knowledge application outcome might have brought to the organization in order to stay survival and competitive (Tsang et.al., 2004). Hence, organization must be able to ensure that new knowledge resource gained from within and outside the organization can be explored and exploited in order to stay survival and competitive (Tsang et.al., 2004). Based on the literature, figure 2.3 shows the framework of knowledge application within the key process of strategic knowledge management.

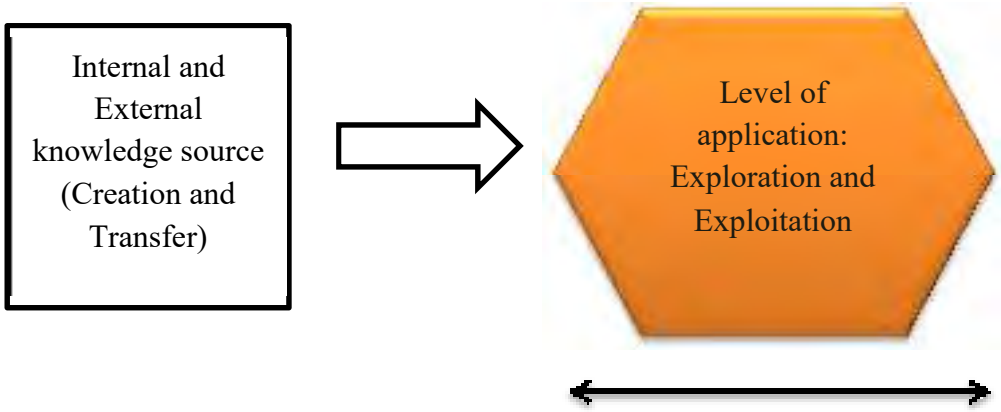



Figure 2.3
*Framework of Knowledge Application Process*
Source: Adapted from Audretsch and Caiazza, (2015)

Figure 2.3 shows the framework of knowledge application within the key process of strategic knowledge management. Internal and external source of new organization knowledge resource comes from the process of knowledge creation and knowledge transfer. Organization then applies the many types of knowledge resource to be embedded into products, services and organizational processes and routines (Cohen & Levinthal, 1990; Kogut & Zander, 1992; Turner & Makhija, 2006). Apart from that, absorptive capacity has become accepted as useful constructs to explore the ability of an organization to apply external knowledge resource (Cohen & Levinthal, 1990; Zahra & George, 2002). In addition, absorptive capacity has been described as a dynamic capability that can facilitate the exploration and exploitation of knowledge resource from external source (Zahra & George, 2002; Fosfuri & Tribo, 2008). According to Zahra and George, (2002) absorptive capacity enhances organization ability to apply external knowledge resource in order to gain and sustained competitive advantage. Past researcher has found evidence that the good absorptive capacity of an actors and organization determine the success of knowledge resource application (Lane & Lubatkin, 1998). Evidently, Bierly, et.al., (2009) and Cepeda- Carrion et.al., (2012) found that the ability to apply new knowledge resource from source to recipient was very much dependent upon absorptive capacity construct of the recipient. Moreover, Vega-Jurado et.al., (2008) and Hurmelinna-

Laukkanen et.al., (2012) has found that absorptive capacity is one of the crucial determinants in order to apply different types of knowledge resource within the alliance partnership towards achieving innovation. To elaborate further, knowledge created and being transferred within the context of alliance partnership such as university-industry-community partnership is not immediately applicable hence it requires a higher degree of absorptive capacity from various actors involved in order to apply the new knowledge resource (Lane et.al., 2006; Newey & Zahra, 2009).

Study by Yanow (2004) give some insight on how external knowledge resource can be applied into the organization. The study suggests that absorptive capacity acted as an integrative mechanism to move exploration knowledge resource within open networks to the exploitation phase within the closed networks. Furthermore, Yanow (2004) argue that most organizations contain internal boundaries which are horizontal and hierarchical and there is no commercial advantage if knowledge resource obtained from external sources failed to be applied internally. Furthermore, study by Harryson et.al., (2008) provide an empirical evidence on the interrelation between knowledge creation, knowledge transfer and knowledge application. Their study found that transformation networks i.e. strong and weak ties; is the important contribution to enhance exploration and exploitation of new knowledge resource in achieving new innovation. Other study on knowledge application is done by Song et.al., (2005), this study examining on the determinants of knowledge application. The empirical results indicates that long-term orientation supported by R&D budget, formal rewards, R&D location and information technology directly increase the level of knowledge application in the organization towards achieving new innovation.

Therefore, this study aims to contribute to the paucity of study on knowledge application process and its contribution towards social innovation by using dimensions of exploration and exploitation. Yet very little research has examined the linkage of knowledge application towards social innovation within the context of university-industry-community partnership (Chalmers, 2012; Ruede & Lurtz, 2012). Next section will discuss on university-industry-community partnership.

## 2.3 University-Industry-Community Partnerships

University is an important source of new scientific knowledge resource (Sakakibara, 2007) and it has become conventionally accepted that knowledge resource from universities is a vital solution for improving social well-being, enhance economic growth and also technological advances (Mansfield, 1991; Breznitz & Ram, 2013). Hence, university-industry-community partnership is an ideal platform to create superior knowledge resource and exchange of knowledge process between university, industry and community actors aimed at enhancing the use of research results of university by industry and community (King, 2007). Furthermore, Rossi (2010) refers university-industry-community partnership as the process involving a wide range of interactions at different levels of knowledge processes and activities mostly aimed at the exchange of knowledge resource and technology between actors. The turning point of university-industry-community partnership is catalyst by the introduction of Bayh-Dole Act 1980 in the US (Shane, 2004; Kotha et.al., 2013), Triple Helix Model developed in the 1990s by Etzkowitz (1993) and Quadruple Helix Model.

The Bayh-Dole Act 1980 was developed to facilitate the academic entrepreneurial activities such as patenting and licensing between the university and industry in the US based on the government funded research (Mowery & Sampat, 2005). To elaborate further, the Bayh–Dole

Act 1980 or also known as Patent and Trademark Law Amendments Act 1980 contribute by enhancing incentives for universities and industries to commercialize university knowledge resource into technological advancement. This is done through the establishment of a uniform patent policy across US federal agencies and uplift the restrictions on licensing of university knowledge resource (Grimaldi et.al., 2011). This legislation allows university and industry to have ownership of inventions in preference to the government (Berman, 2008). With this amendment, there are an increasing number of growth in terms of patenting and licensing activities by university and industry partnership (Siegel, et.al., 2003). Furthermore, the literature revealed that this act contribute to the growing share of conceptual and empirical researches in the aspects of university academic entrepreneurial activities namely patenting, licensing, spin-out and start-up company (Shane, 2004; O'Shea et.al. 2007; Perkmann & Walsh, 2007; Kotha et.al., 2013); University revenues (Thursby et.al. 2001; Rothaermel &Hess, 2007); Diffusion of technology transfer office and science parks (Seigel et.al. 2003); and university- industry relational collaboration (Plewa et.al., 2013).



Continuously, the Triple Helix Model has been the indicator towards changes in the relationship between university, industry and government within knowledge based and social contract society (Hessels & Van Lente, 2008). To elaborate further, the changes refer to the shift of dual relationship of industry and government to a growing triadic relationship of university, industry and government. Within the literature, the introduction of the Triple Helix Model by Etzkowitz (1993) is building upon the precursor works by Lowe (1982) and Sabato and MacKenzi (1982); which comes from the era of remarkable growth in biomedical research. Based on the work of Lowe, (1982) and Sabato and MacKenzi, (1982) government plays a leading role in the university and industry relationship due to the limited opportunity towards exploiting new knowledge resource from university. This is due to the significant

reduction on government financial support for basic research. Furthermore, Lowe (1982) highlighted that shifting from industry and government relationship into a more meaningful triadic relationship which includes university, promotes to enhance new innovation, economic and social development in the knowledge-based society. Figure 2.4 illustrates the Triple Helix model of university, industry and government relationship.

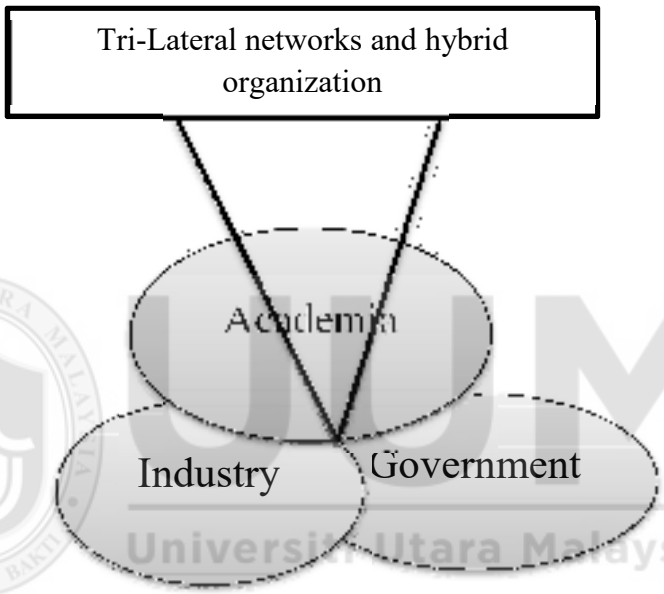





Figure 2.4
*The Triple Helix Model (Interacting spheres)*
Source: Adapted from Ranga and Etzkowitz (2013)

Based on figure 2.4, the triple helix model of innovation is based upon the tri-lateral networks of interaction between university, industry and government (Ranga & Etzkowitz, 2013). The increase importance of knowledge resource and the role of university as the transmitter of knowledge resource to the industry have given university a prominent role in the industry innovation horizon (Etzkowitz & Leydesdorff, 1995). The Triple Helix Model consist of i) Components (Institutional spheres of university, industry and government) ii) Relationship

between components (Collaboration) and iii) Functions (Knowledge resource , innovation and consensus space) (Ranga & Etzkowitz, 2013). The hybrid organization provides a relevant solution for innovation strategies and also to overcome the key flaws within the relationships for example strong focus on institutions, low understanding among actors and problem arises from system boundaries (Malerba, 2002).

Continuously, within the triple helix model, government acts as a leading role in promoting the dynamic interactions between the university and industry (Yuan, et.al., 2010). The facilitating role of government is seen within many nations as such in Malaysia through the various policies and financial contribution that have been put in place to enhance university-industry-community partnership. These policies provide a platform for the university to interact and share knowledge and ideas. Thus, it operates according to an interactive manner rather than a linear model of innovation. As industry raises its technology level, it moves closer to an academic model and engaging in higher level of training and sharing of knowledge resource. Government acts as a public entrepreneur and venture capitalist adding up to its traditional regulatory role in setting the rules of the institutional spheres. As a result, three institutional spheres are increasing intertwined with the spiral pattern of collaboration and emerged at various stages of innovation and policy making process (leydesdorff & Etzkowitz, 1998).

Triple Helix Model also acts as a tool in providing a comprehensive view for actors in terms of relationship and knowledge resource flows within the system (Godin & Gingras, 2000). In addition, The Triple Helix Model is a spiral model of innovation that captures multiple reciprocal relationship and network of communication at different level in the process of creation and capitalization of knowledge resource and creates a new paradigm of

collaboration between university, industry and government (Etzkowitz, 2000). By reviewing the Triple Helix Model, many authors argued that the model is not sufficient for long term innovation growth (Carayannis & Campbell, 2009). Arnkil et.al., (2010) stress that there is a need for a fourth helix to be link with the previous triadic relationship of university, industry and government.

Quadruple Helix Model is the extended form of knowledge based innovation processes consist of four elements of relationship namely; university, industry, community and government (Afonso et.al., 2012). Within the innovation literature, public or civil society is identified as the new fourth helices of quadruple helix model. Public or civil society acting as a user-driven innovation mechanism in order to ensure the success of both industry and public sectors institutions towards improving social well-being within the context of strategic knowledge management (Yawson, 2009). To elaborate from the previous statements, with the emergence of globalization and localisation aspect which Carayannis (2008) term as "gloCalising", diverse human knowledge resource and dynamic of social and cultural knowledge resource is of importance to be embedded and integrates into innovation and served as specialised capabilities in the knowledge based economy (Carayannis & Campbell, 2009).

Furthermore, quadruple helix model is a comprehensive based innovation concept that relates strategic knowledge management activities with the outcome of social and commercial driven benefits that subsequently gives wider society an improved quality and quantity of life (Carayannis et.al., 2012). Afonso et.al., (2012) highlighted in the quadruple helix model, university and industry provide integrated innovation ecosystem, while government provide financial support and regulation system and public or civil society demands for ever new

innovation of products, processes and services in order to improve the quality and quantity of life (Lizuka, 2013). In addition, Carayannis and Campbell (2009) describe within quadruple helix model, society demands continuous new innovation through new knowledge resource created within strategic knowledge management processes. The demand of continuous new innovation is done through communication and association process among society member by highlighting the top priority innovation which must be dealt urgently by the university-industry- community and government collaboration. Hence, quadruple helix model recognises the new actor which is the community as the new actors of innovation concept. With the diversity of actors and interactive innovation networks, quadruple helix model is driven by a pluralism of knowledge resource and innovation as well as paradigm of knowledge modes (Carayannis & Campbell, 2009). Therefore, understanding the triple helix and quadruple helix model is very relevant and consistent to this study since both model explained the integration and interaction of multiple actors in particular the university, industry, community and government in achieving social innovation.



In continuous with the above paragraphs, the literature has also identified several other emerging factors among others changes of university roles, economic changing trends, industrial survival, government new roles and societal pressure (Meyer-Krahmer & Schmoch, 1998; Rynes & Trank, 1999) that sparked the substantial increase of university-industry-community partnership worldwide for example in the US (Masfield, 1991); Japan (Fransman & Tanaka, 1995); EU countries (Caloghirou et.al. 2001); and UK (Powers, 2003; Howlett, 2010). University changing roles: Traditionally, university have performed mostly research and education functions (Etzkowitz, 2002). According to O'Shea et.al., (2005), there is a growing need for university to create and transfer knowledge resource generated beyond the academic community. To elaborate further, the rise of knowledge based economy has been

the catalyst for the changing roles of university to be more entrepreneurial and engaged with the academic commercialization activities (Guena & Muscio, 2008; Lu & Etzkowitz, 2008). As a result, many universities have actively engaged in academic entrepreneurial activities by converting new scientific knowledge resource into commercial activities with industries partner. These include academic spin-off, start-ups company, patenting and licensing of invention (O'Shea et.al., 2007). The earliest university-industry-community partnership can be seen through the collaboration of elite universities among others MIT, Stanford University, Cambridge University and Oxford University with their respective industry and community partners (Stam & Garnsey, 2009). A recent study by Cosh and Hughes (2010) provide evidence of the changing roles of university in the context of academic entrepreneurial activities. The study highlighted university academic entrepreneurial activities in the country such as in the US and UK had contributed immensely to the nation economic growth and job creation. MIT and other leading universities in the US have created US$ 33 billion to the US economy, produced 3376 new companies and contributed 280,000 jobs to the US citizens from the period of 1980 to 2000 (Shane, 2004). Moreover, in the UK, Cambridge and Oxford university established the "Cambridge phenomenon" which helps to establish 36,000 new jobs in the year 2000 as compared to just around 25,000 in 1988 and producing more than $3 billion a year in revenues (Stam & Martin, 2011).

In today's environment, university provide skilled workers, produce and disseminate knowledge resource through R&D, research publications, patenting, licensing and prototyping. In addition to that, university also perform a problem solving activities for industry through contract research, consultation and incubation and provide public space where individuals can meet and exchange knowledge resource and ideas. According to Etzkowitz and Leydesdorff (2000), university are no longer being viewed as an ivory towers

institution that produced knowledge resource in isolation. University now have the third mission to complements the traditional research and teaching mission (Rossi & Rosli, 2013). The third mission of university is term as entrepreneurial roles (Berkovitz & Feldmann, 2006). The roles includes 1) The collaborative research of university-industry; 2) Contract research and academic consulting; 3) The development and commercialization of intellectual property rights (Patenting, licensing, spins-off and start-up company; 4) Co-operation in graduate education, human resource, advance training for industry worker and 5) Exchange of research between university-industry-community (Friedman & Silberman, 2003). The new roles of the university are regards as the contributors of knowledge resource to the economic development apart from the traditional teaching and research roles (Smith, 2007). The changing of economic trend encourages industry to find university partners in order to have collaboration in R&D activities. Within this open innovation strategy, university play an important role in leveraging university knowledge resource to create value to the industry and community partner. According to Perkmann et.al., (2011), many multinational companies among others Glaxo Smith Kline, Novartis and Rolls Royce are forming alliance with university in order to get access to superior knowledge resource and to generate deep expertise in the specific industry area. The reason behind this is due to the cost reduction and lack of in-house capabilities to create strategic knowledge resource (Hamel & Prahalad, 1994). Other factors such as rapid technological change, shorter product life cycles and intense global competition is said to be among the indicators that contributes to the growth of university-industry-community partnership. These factors create pressures especially for the industry in order to stay competitive (Bettis & Hitt, 1995; Bartlett & Ghoshal, 2013). Furthermore, to rely solely on internal knowledge resource is too expensive and risky under most condition (Hamel & Prahalad, 1994; Granstrand et.al., 1997). According to Lee and Win (2004), industries are increasingly under pressure to shorten the amount of time to get the

products to the market. Through the university-industry-community partnership, industry is able to capitalise in bringing up the products to market quicker than before. Furthermore, industry ability to create innovative products is improved considerably through university-industry-community partnership (Dyer & Hatch, 2006).

Government roles are also a factor that stimulates university-industry-community partnership growth. Many governments namely the UK, USA, EU countries, Latin America and Asia recognised the importance of university-industry-community partnership as the forefront of economic attention (Bramwell et.al., 2012). These governments encourage university, industry and community to work together in exploring new knowledge resource and to stimulate and bolster economic growth, enhance social development and improve job creation (Edler et.al. 2011). According to Cohen et.al., (2002) and Wright et.al., (2009) many initiatives and facilities have been implemented and applied by the governments to promote the growth of university-industry-community partnership. This includes deploying tax payer money and additional funds into higher education research, providing tax breaks for industry that sponsoring university research, develop various policy initiatives such as new acts to encourage and stimulate partnership and facilitating policies and procedures to encourage university-industry-community partnership. For example, the Australian government through its 2009 strategy document titled "Powering ideas-An innovation agenda for the 21st Century" give emphasis and priority towards university-industry-community partnership by increasing the number of partnership and collaboration among Australian industries, universities, community and public funded research agencies for the next decade and also encouraging international collaboration on R&D (Commonwealth of Australia, 2009). Furthermore, Canadian government through its Federal Government strategy documents titled 'Mobilizing Science and Technology (2007)', also provide a considerable financial incentives in order to

enhance government commitment towards encouraging partnership and collaboration between academia, industry and community sectors (Bramwell et.al., 2012).

In the UK, Business Innovation and Skills (BIS, 2010) and Research Council United Kingdom (RCUK, 2010) had reported, a substantial amount of government grants has been allocated to help and support partnership and collaboration activities between university-industry-community since the year 2006. Furthermore, Malaysian government had also allocated huge amount of financial assistance through tax payer money and public investment fund in stimulating the university-industry-community partnership under the GTP and ETP in the 10th National Plan (2011-2015). In this plan, university-industry-community partnership is regarded as one of the 12 main key elements to be implemented in order to achieve a status of high income country by the year 2020 (PEMANDU, 2012). Thus the importance given by the many governments throughout the world in respect to the university-industry-community partnership is imminent.



### 2.3.1 Actors in the University-Industry-Community Partnership

As identified in the earlier sections of this chapter and also in the triple and quadruple helix model, a wide range of actors interact during the processes of strategic knowledge management i.e. creation, transfer and application within university-industry-community partnership. According to Tornatzky, et.al., (1999), Seigel et.al., (2003) and Bradley et.al., (2013) the main actors that involves in the university-industry-community partnership are academia, industry and community actors. Specifically, academia acts as a supplier of vital knowledge resource (Eztkowitz & Leydesdorff, 2000). Academia relates with industry and community actors through wide range of interaction within strategic knowledge management activities such as R&D, joint research, academic commercialization activates and network

participation in translating new knowledge resource into new technology (Abreu, et.al., 2008). In addition, these activities produce superior knowledge resource which used to generate new innovation (Stevens &Bagby, 2001). Furthermore, as for the industry, the main role is to pursue the competitive advantage in the global marketplaces in order to stay survival (Tornatzky et.al., 1999). Acting as an economic beneficiary, they have to leverage knowledge resource generated from the university through the means of academic commercialization activities such as patenting, licensing and commercial spin-offs and in return gaining commercial benefits (Mowery & Sampat, 2005). A part from that, industry plays a key role in sharing market-related knowledge resource and business expertise with university in order to creates invaluable new knowledge resource through university-industry-community partnership (Wright et.al., (2009). Community act as an indicator in the university-industry-community partnership towards the needs and demands of the society in order to improve social aspects (Mulgan, 2006) and to bolster economic growth (Audretsch, et.al., 2012). Within university-industry-community partnership, community roles contradict with the industry actor, whereby community actors more emphasis on social value rather that commercial value (Sharra & Nyssens, 2010). Community actors often act as a check and balance in the university-industry-community partnership. Furthermore, community actors also plays a key role in sharing social aspect knowledge resource with other actors in order to creates invaluable new knowledge resource that can be commercialised in fulfilling the broader social responsibility (Bramwell et.al. 2012; Audretsch, et.al., 2012).

As the determinant factor in achieving social and commercial needs, the role of the government is to facilitate the partnerships in terms of research funds, statutory frameworks, determine the scope of public goods and also giving a direct support to the partnerships (Wright, et.al., 2009). Government also play and important role within the university-

industry-community partnership in addressing the issue of social and human needs (Cunha & Benneworth, 2013). To elaborate further, government act as a mediator in making sure actors within university-industry-community partnership not only focus on the profit-maximising but most importantly focus on addressing the issue of social aspects that can offer a better solution for all stakeholders concerned (Lizuka, 2013). According to Edmondson et.al., (2012), when university-industry-community partnership is being managed successfully it gives a remarkable benefits in terms of social, economic and technological aspects of a country (Geuna & Muscio, 2008). However, understanding specific identity of various actors is important (Argote & Ingram, 2000) and interactions between all actors in the university-industry-community partnership is also essential because the actors involves have different motives and behaviours, often display mutual distrust and also operate in a different environment setting which may arises a considerable disagreement and misunderstanding within the partnership (Bercovits & Feldmann, 2006). Accordingly, to make the partnership work, all actors must understand the processes of strategic knowledge management within the context of university-industry-community partnership. This study will explore the level of understanding of association between strategic knowledge management processes and social innovation in the university-industry-community partnership.

## 2.4 Summary of Literature Review

This chapter has discussed the main literature related to the context of the study namely social innovation, strategic knowledge management processes and university-industry-community partnership. Social innovation was explored which resulted in gaps and consequently formed a need for this study. This study apply dimensions of social innovation i.e. workplace organization, organization innovation and social capital; and will be explored through the dimensions of strategic knowledge management processes i.e. knowledge creation,

knowledge transfer and knowledge application within the context of Malaysian university-industry-community partnership project ecosystem. To elaborate further, this study used socialization, externalization, combination and internalization as the dimensions of knowledge creation; communication and transformation as the dimensions of knowledge transfer and exploration and exploitation as the dimensions of knowledge application.

Social innovation is seen as an old paradigm and centred within the field of public policy and sociology (Klein, et.al., 2010). Furthermore, the focus of social innovation is very much central and exclusively connected to the notion social purposes and distinct from any technological driven innovation in the sense that technological or business innovation is profit seeking innovation (Pol & Ville, 2009). Hence, new innovation and strategic knowledge management has been discussed and associated widely with economic value, commercial success and also technological advances. This situation creates under-investment in today's economic perspectives because of the significant value in the social innovation that might be brought forward to contribute towards improving living conditions of human kind and to prosper economic growth. Therefore, examining strategic knowledge management processes as the determinant of social innovation is of great importance in order to understand the linkage and diffusion of both towards social and technological change and improves quality and quantity of life (Cajaiba-Santana, 2014). Moreover, the used of social innovation as an outcome will aid a new exploration of strategic knowledge management processes in the university-industry-community partnership and contribute to the paucity of study towards social innovation concerning with issues of social economic growth, development of human well-being and societal quality of life (Chalmers, 2012; Cunha & Benneworth, 2013; Lizuka, 2013). However, less attention is paid examining social innovation as an outcome of strategic knowledge management activities, particularly in the context of university-industry-

community partnership. Literature suggests that there is an urgent need of comprehensive overview and analysis on the empirical evidence of social innovation and strategic knowledge management processes. In addition, a complete and extensive understanding on the insight of how social innovation and strategic knowledge management processes is linked and connected across organizations must be seriously engaged (Battisti, 2012). Empirical studies also shows that this must be done in order to balance competitive pressure that drives innovation more towards technical and commercial markets. This situation provides huge opportunity to discover social innovation contribution through the implementation of strategic knowledge management processes that can improves social life and stimulate business development (Kanter, 2013). Therefore, this study considers this gap and stressing the need for the study. Next chapter (Chapter Three) will discuss in detailed the underpinning theory, hypothesis development and theoretical framework of this study.

# CHAPTER THREE

# UNDERPINNING THEORY, HYPOTHESES DEVELOPMENT AND THEORETICAL FRAMEWORK

## 3.0 Introduction

This chapter presents the underpinning theory, hypotheses development and theoretical framework used in this study.

## 3.1 Underpinning Theory of the Study

The literature discussed and suggests two main underpinning theories on the importance of knowledge resource in achieving social innovation as a new innovation outcome strategy within the knowledge-led economy namely; The Resource Based View and Knowledge Based View theories. RBV theory refers to resources that are valuable, rareness, inimitable and non-substitute that provides long term sustainable competitive advantage. Accordingly, KBV theory discussed specifically on knowledge resource that generates through strategic knowledge management processes i.e. knowledge creation, knowledge transfer and knowledge application. This knowledge resource is regards as the valuable intangible resource that creates highly innovative and long term sustainable competitive advantage within products, processes and services that leads to achieve social innovation and subsequently improves quality and quantity of people's life, enhances economic growth and improves technological advances. Hence, both theories will be discussed in details.

### 3.1.1 Resource Based View Theory (RBV)

RBV theory is originated from the earlier research by Penrose (1959) and Rubin (1973) where they give emphasis on the importance of organization resources and its contribution towards organization competitive advantage. Building upon the work of Penrose (1959) and Rubin (1973), Wernerfelt (1984) asserts that organization competitive advantage not only driven by its products but also its resources and therefore, identifying and acquiring dynamic and superior resources is critical for organization for the development of highly innovative products, processes and services. Since the departure of the pioneer works mentioned above, RBV theory is then regards as one of the most widely accepted theoretical perspective within the strategic management literature (Newbert, 2007). From the above statement, RBV theory suggested that an organization sustainable competitive advantage lies primarily on its dynamic and superior resources (Penrose, 1959; Wernerfelt, 1984; Barney, 1991). Generally, organization possess a broader set of resources and specifically, these resources is comes from tangible resources namely; fixed assets, raw materials, financial capital, and human resource; and intangible resources i.e. knowledge, organization efficient system (Wernerfelt, 1984). All of these resources are the primary determinants of developing new highly innovative products, processes and services towards achieving sustainable competitive advantage (Barney, 1991; Hall, 1993; Runyan et.al., 2006).

However, Grant (1991), Mahoney and Pandian (1992) and Priem and Butler, (2001) argued that even though resources is the central focus within RBV theory, organization capabilities which refers to human skills and efficient systems within an organization is also paramount in order to exploit and leverage the said dynamic and superior resources towards achieving sustainable competitive advantage. According to Grant (1991), Mahoney and Pandain (1992) and James (2004), mere dependent on dynamic and superior resources is not sufficient if it is

not supported by distinctive capabilities i.e. skills, better coordination and application, efficient and effective organization systems; in making better use of the resources. For Prahalad and Hamel (1990) and Barney et.al., (2001), they stressed that organization dynamic capabilities is developed through collective learning. In addition, they highlighted through collective learning, organization enhance the ability to learn new skills, improves individuals skills and also create new innovative system and processes (Barney et.al., 2001). Furthermore, Prahalad and Hamel (1990) highlighted in order to create highly innovative products, processes and services, organization distinctive capabilities must goes together with superior resources in order to make the most significant contribution to the organization as compared to resources alone. Hence, organization with the combination of dynamic resources and distinctive capabilities may have a strong foundation in acquiring and sustaining the competitive advantage (Peteraf, 1993; Henderson & Cockburn, 1994).

Barney (1991) and Teece et.al., (1997) highlighted RBV theory is based on the assumptions that resources within an organization are heterogeneous and they are imperfectly mobile. Heterogeneous refers to the diversity and different nature of resources that the organization possesses. On the other hand, imperfectly mobile is refers to the resources that the organization have which is very costly and difficult to imitate. Drawing upon the above statements, Barney (1991) categorised four attributes of organization resources within RBV theory in order to provide sustainable competitive advantage. According to Barney (1991) organization resources must be valuable, rareness, inimitable and no substitutes. To elaborate further, James (2004) highlighted resources must be valuable to the organization in order to implement strategies that can improve its efficiency and effectiveness. Furthermore, valuable organization resources enable organization to exploit opportunities and neutralised threats of organization environment (Barney et.al., 2001). Moreover, organization resources must be

rare and unique. Das and Teng (2000) states that, deploying rareness and unique resources which cannot be possess by other competing organization in the same way that the organization do, give first mover advantage to organization in generating sustainable competitive advantage. Following on, organization resources must be difficult to copy and imitate and finally there should be no substitutes or similar resources that are available for other competing organization (Michalisin et.al., 1997; Teece et.al., 1997).

Central to the conceptual discussion of RBV theory above, in the present economic situation, knowledge resource has emerged as the valuable, rare, inimitable and non-substitutable organizational resource which can lead to unique value creation of new innovation and sustainable competitive advantage (Nonaka & Takeuchi, 1995; Miller, 2012). According to Meier, (2011) this requires organization to develop and implement strategic knowledge management processes that could generate new valuable, rare, inimitable and non-substitutable knowledge resource and capabilities. Prahalad and Hamel (1990) and Walter et.al., (2007) assert that, knowledge resource can provide premium value for organization, and organization that dependent on knowledge resource outperformed those organization that is rely on traditional tangible resource i.e. fixed assets, raw materials, financial capital, and human resource (Grant, 1996; Barney, 2001). Hence, this indicates the need for strategic knowledge management processes to be implemented by the organization in order to acquire valuable, rareness, inimitable and non-substitutes resources and capabilities as stated in the RBV theory.

Specifically, strategic knowledge management processes involves the dynamic interplay of two types of knowledge resource i.e. tacit and explicit knowledge, and actors and organization absorptive capacity towards creating new superior knowledge resource (Argote & Ingram,

2000; Esterby-Smith et.al., 2008). These two strategic knowledge management elements enable organization to possess a new superior knowledge resource and capabilities that can be integrated into products, processes and services which make them highly innovative and consequently fulfil organization objective in order to achieve a sustainable competitive advantage (Miller, 2012). The knowledge creation, knowledge transfer and knowledge application process of strategic knowledge management is said providing organization with knowledge resource that fulfil the four attributes i.e. valuable, rareness, inimitable and non-substitutes as highlighted within the RBV theory. Evidently, studies by Menon and Pfeffer (2003) and Perez-Nordtvedt et.al., (2008) found that when organization implement strategic knowledge management processes particularly across organization boundaries, knowledge resource and capabilities created appears to be valuable, scare, unique, and inimitable which is parallel with the concept of RBV theory. Furthermore, Abdul Jalal et.al., (2013) note that the creation of inimitable knowledge resource and capabilities within strategic knowledge management processes creates new and novel solution to the organization products, processes and services. Accordingly, this new and novel solution i.e. new knowledge resource, is embedded into organization products, processes and services which simultaneously provide organization with better use of resources and improved capabilities and subsequently contributes towards improving social well-being, enhance economic growth and gives technological benefits to the wider citizens concerned (Lizuka, 2013).

Within the literature, several studies have adopted RBV theory and its assumptions as a theoretical lens in exploring social innovation with knowledge resource and capabilities (Hoffman et.al., 2005; Lavie, 2006). To show evidence, a conceptual study by Gardner et.al., (2007) in healthcare research found that, the strategic knowledge management partnership between public and private institutions shows a significant contribution towards creating

superior knowledge resource which act as a new solution in order to develop new highly innovative health products, processes and services i.e. new medicines, vaccines, devises and also diagnostics which in turn provide source of inimitable competitive advantage, improves wider society health and enhance economic and technological aspects (Sharra & Nyssens, 2010). An empirical study by Maruyama et.al., (2007) examining on the Japanese wind power community projects found that knowledge creation, knowledge transfer and knowledge application process creates dynamic knowledge resource and capabilities that leads to unique competitive advantage of its renewable energy and subsequently improves welfare services of its people in terms of enhancing quality and quantity of citizens life. Furthermore, a conceptual study by Batistti (2012) explained that in order for organization to possess a long term competitive advantage within the new era of knowledge-led economic environment, organization must take consideration of both social innovation and knowledge resource.

In line with the RBV theory, Batistti (2012) conducted a study within knowledge intensive companies. The findings indicates that valuable, rareness, inimitable and non-substitutes knowledge resource and distinctive capabilities that created through the processes of knowledge creation, transfer and application creates new dynamic products, processes and services and leads to a novel solution in overcoming social problems and also provide unassailable competitive advantage for organization survival (Von Nordenflycht, 2010). In more recent study, Sanzo-Perez et.al., (2015) examining social innovation from the perspective of RBV theory in the 325 Spanish non-profit organizations. Their study found that high level interplay of tacit and explicit knowledge resource and social interaction in the process of knowledge creation, transfer and application provide valuable new knowledge resource and skills which positively effects the development of unique products, processes and services and enhance social innovation. Furthermore, their study highlighted the

implementation of strategic knowledge management processes within the Spanish non-profit organizations satisfy employee's human needs and expectation, improves employee's quality of working life and enhance employee's tacit knowledge. This portrays the concept of RBV theory support the association of both social innovation and knowledge resource. Interestingly, drawing upon the work by Sanzo-Perez et.al., (2015), the dynamic strategic knowledge management processes can best be explained through the concept of absorptive capacity. Similar to RBV theory, absorptive capacity refers to the dynamic capabilities which involve the element of acquisition, assimilation, transformation and exploitation of knowledge resource to produce rare organizational capability that enhance organization innovation and competitive advantage (Zahra & George, 2002).

Understanding the concept of RBV theory and associated its assumption with social innovation and knowledge resource has created new paradigm in helping to overcome and improves social, economic and technological problems. Moreover, drawing upon the conceptual and empirical studies above, it shows evidence that various studies on social innovation as a new innovation outcome strategy and knowledge resource significantly use the RBV theory in explaining their theoretical framework with regards to social innovation outcome. Therefore, this study used RBV theory as one of the underpinning theory in this study. Next section will discuss on KBV theory.

### 3.1.2 Knowledge Based View Theory (KBV)

KBV theory is a continuation from RBV theory (Gehani, 2002). RBV theory regarded organization as a broader set of resources (Wernerfelt, 1984) and organization that acquires valuable, rareness, inimitable and non-substitutes resources and capabilities is said to achieved sustainable competitive advantage (Barney, 1991; Barney et. al., 2001). KBV theory

highlighted knowledge resource is the only significant resource of an organization that can leads to unique innovation and competitive advantage (Nonaka et.al., 2000; Nonaka & Toyama, 2007). According to Grant (1996), valuable knowledge resource, knowledge products, processes and services and knowledge capabilities are regarded as the prime strategic resources and the basis of innovation and competitive advantage. To elaborate further, valuable knowledge resource, knowledge products, processes and services and knowledge capabilities are comes from tacit and explicit knowledge of actors and their organizations when it is being applied within the processes of strategic knowledge management i.e. knowledge creation, knowledge transfer and knowledge application (Nonaka & Von Krogh, 2009). Given that, KBV theory specifically emphasis on the nature and role of knowledge resource in achieving organization innovation and competitive advantage (Spender, 1996). Table 3.0 summarize knowledge resource, knowledge products, processes and services and knowledge capabilities.



Table 3.0
*Knowledge Resident in People, Products, Processes and Services*

| | |
|---|---|
| **Knowledge resources** | Know-how, skills, accumulated learning and knowledge, experience, relationships, training, judgement, intelligence. Stocks of available assets that a firm owns or controls |
| **Knowledge products, processes and services** | Knowledge embedded in products, processes and services with high Intellectual capital content. Enhanced Knowledge-intensive services. |
| **Knowledge capabilities (processes)** | Embedding knowledge into business activities, teamwork, insight of managers and workers, routines, processes and management decision making. A firm's capacity to deploy its resources. |

Source: Adapted from James (2004).

From table 3.0 above, James (2004) categorised knowledge resource, knowledge products, processes and services and knowledge capabilities as an organization knowledge assets. Knowledge assets are defined as knowledge-based resource or capability of value that enables products, processes and services to be provided and has an economic life viable within industry and market context (James, 2004). Moreover, knowledge assets are stocks of knowledge resource which are used to create new innovation, achieve sustainable competitive advantage and offer new potential and add value for future organization growth (Nonaka & Takeuchi, 1995). According to Andriessen (2001) knowledge resource is individual knowledge i.e. tacit and explicit knowledge; possessed from other organization actors, organization existing products, processes and services that developed through experience, observation and training. This knowledge resource is subsequently used by embedding it into products, processes and services (Afuah, 1998). In addition, knowledge capabilities are the cognitive learning, collective values, norms and management processes (Nonaka & Nishiguchi, 2001).



Within the KBV theory, knowledge has been identified as vital resource in order to enhance organization competitive position. In addition, KBV theory stressed that continuous development and implementation of strategic knowledge management processes i.e. knowledge creation, knowledge transfer and knowledge application; massively contribute towards organization security in terms of to keep them on top of rapid change within economic environment that they operates (Pun & Nathai-Balkissoon, 2011). Subsequently, act as the central premise for creating new and continuous innovation and also to sustained competitive advantage (Nonaka et.al., 2000). Nonaka and Takeuchi (1995), Alavi and Leidner (2001) and Turner and Makhija (2006) identify that strategic knowledge management processes is the platform to leverage superior knowledge resource that can be adopted by

organization in response to the economic changing environment. Drawing upon the above statements, considerable amount of studies focus on KBV theory as their underpinning theory when explaining the phenomenon of strategic knowledge management processes and its contribution towards new innovation and competitive advantage (Woiceshyn & Falkenberg, 2008; Gorovaia & Windsperger, 2013). To show evidence, many studies for example Gopalakrishnan et.al., (1999), Tsai, (2001), Subramanian and Venkatraman, (2001), and Brewer and Brewer, (2010) explained that effective strategic knowledge management processes can greatly facilitate new innovation into products, processes and services in order to gain commercial and technological benefits. Furthermore, the above studies also highlighted, knowledge creation, knowledge transfer and knowledge application process also improve the quality and development of product, processes and services (Martensson, 2000; Liao & Hu, 2007) and also increase responsiveness to internal and external market changes (Sveiby, 2001).

Despite the widespread acceptance of KBV theory on its theoretical contribution towards technological and commercial driven innovation, past researches also recognise the importance of strategic knowledge management processes and knowledge resource towards social value and benefits (Perkmann & Walsh, 2007; Steenkamp & Kashyap, 2010; Guerrero & Urbano, 2012). Lettice and Parekh, (2010) agreed with the previous statement by stating knowledge resource is a new solution not only for economic development but most importantly to improves social well-being of the people. Studies by Shane, (2004), Stam & Garnsey, (2009), Geiger, (2012) and Bramwell et.al., (2012) shows evidence that knowledge resource through the implementation of strategic knowledge management processes between public and private organization i.e. university-industry-community partnership had a social benefits spill-over i.e. Social innovation. In continuous, their studies found that the creation of

high prominent technological regions among others the Silicon valley, Cambridge region and also Waterloo region through strategic knowledge management processes within university-industry-community partnership had generates substantial amount of new business creation and also numerous employment opportunity to the citizens in the develop countries among others in the USA, UK and Canada. Thus, the effects of strategic management processes benefited to the public and society as a whole apart from private value and commercial gains to the industry and entrepreneurs (Elliot, 2013).

In line with the KBV theory, the creation of superior knowledge resource involves the combination of tacit and explicit knowledge (detailed discuss in chapter two) (Nonaka & Takeuchi, 1995). These two types of knowledge resource, particularly tacit knowledge, are embedded with inimitable competitive advantage and dynamic capabilities that possess by various actors and organizations (Kogut & Zander, 1992; Jasimuddin et.al., 2005). Literature had suggests that strategic knowledge management processes across organization boundaries is the most significant and central platform in a quest for creating superior knowledge resource (Menon & Pfeffer, 2003; Perez-Nordtvedt et.al., 2008; Huggins, 2010). Hence, with the involvement of diverse backgrounds of actors and organizations in the strategic knowledge management processes can leads to the development of unique social capital among actors and also enhance individual actor's specific knowledge (Presutti et.al., 2007), thus contributes towards social innovation (Benneworth & Cunha, 2015). In addition, Miller (2012) explained that these actors and organization carries with them different and distinctive type of tacit and explicit knowledge. To elaborate further, within strategic knowledge management processes for example as in university-industry-community partnership, actors and organizations participated in sharing, learning and application of tacit and explicit knowledge (Inkpen & Tsang, 2005; Perkmann & Walsh, 2007). This action occurs through

social relations i.e. formal and informal interactions and integrations (Jasimuddin, 2007; Vega-Jurado et.al., 2008; Hotho et.al., 2012). According to Coff et.al., (2006) and Aalbers, et.al., (2014), social network relations within strategic knowledge management processes developed actors with distinctive creative thinking through high degree of connectedness and frequent social interactions which provide high level of trust and cooperation for exchanging tacit and explicit knowledge and information which subsequently enhance their valuable social capital and improves individual tacit and explicit knowledge (Jansen et.al., 2005). Therefore, parallel with the KBV theory, knowledge resource contributed to the social innovation by adding value to organization social assets i.e. social capital and individual knowledge; that is essential for strategic knowledge management processes besides its contribution towards enhancing economic growth and the creation of technological advances (Manning, 2010).

Literature has also identified that knowledge resource through strategic knowledge management processes is used as a mechanism in addressing social problems and challenges (Jofre, 2008; Rossi, 2010). For example, according to Hasselmo and McKinnell, (2003) and Safford (2004), strategic knowledge management activities between university-industry-community partners in the USA successfully created superior knowledge resource that can be applied into products, processes and services in solving farmers agricultural problems and local tire industries problems and in turn benefited wider local communities in terms of overcoming social problems, enhance economic growth and provide new technological advances. Furthermore, according to Perkmann et.al., (2011) and Stam and Martin (2011) various multinational company among others, IBM, Napp Pharmaceuticals, GlaxoSmithKline, Novartis, Siemens, Microsoft and Rolls Royce are engaging with universities through strategic knowledge management activities specifically to focus on creating superior

knowledge resource that can be embedded into their respective products, processes and services. Interestingly, these valuable products, processes and services provide long term solutions and sustainable competitive advantage for the industries and subsequently contribute massively towards social, economic and technological aspect (Bramwell et.al., 2012). For example, GlaxoSmithKline, Novartis and Napp pharmaceutical with their respective university partners generates deep new superior knowledge resource and applied it into inimitable pharmaceutical products, processes and services in specific diseases area which consequently improves wider society health issues (Perkmann et.al., 2011). In addition, IBM, Microsoft and Rolls Royce works with university partners in various engineering fields for example in computer and mechanical engineering and successfully creating a valuable knowledge resource to be embedded into products, processes and services which makes them highly innovative and in turn have a substantial multiplier effects on economic growth, enhance employees and actors human resource value in terms of enhancing skills and talent through long lasting relationship (Perkmann & Salter, 2012).



Therefore, from the above discussion, RBV and KBV theories acknowledge the importance of superior knowledge resource as the key to achieve social innovation and to have a sustainable competitive advantage. Therefore, this study used RBV and KBV theory as the theoretical lens in examining strategic knowledge management processes and its contribution on social innovation. Next section will discuss on hypotheses development of this study.

## 3.2 Hypotheses Development

This section discusses about the direction of relationships and the development of the hypotheses regarding the expected association between dependent variable and independent variables. This section will also draw the hypotheses for the dimensions used in the dependent and independent variables.

### 3.2.1 Knowledge Creation and Social Innovation

In every country in the world, organization are facing with intense globalization issues, rapid technological change and shorter product life cycles which exposed them to the immense pressure to be able to continuously possess superior knowledge resource in order to be competitive, to achieve continuous innovation and to contribute towards improving social well-being (Bartlett & Ghoshal, 2013). Accordingly, Afuah (1998) highlighted modern concept of innovation regards knowledge resource as the most significant resource for organization to produce continuous new innovation into products, processes and services. These modern concepts of innovation is depending upon organization ability and capability to create, transfer and apply knowledge resource which is come to be known as strategic knowledge management processes (Alegre & Chiva, 2008; Meier, 2011). Knowledge creation is one of the processes within strategic knowledge management where among others organization forms strategic alliances with others to create and possess superior knowledge resource and to enhance capabilities (Nonaka & Takeuchi, 1995).

From the above paragraph, the creation of superior knowledge resource and capabilities is created under the dimensions of knowledge creation i.e. socialization, externalization, combination and internalization; where it involves the conversion and interaction of tacit and explicit knowledge resource (Nonaka & Konno, 1998). Accordingly, the knowledge resource

and capabilities formed from the conversion and interaction of tacit and explicit knowledge resource provide organization with a new novel solution and idea that can be embedded into products, processes and services in order to achieve inimitable competitive advantage and consequently contribute towards social well-being, economic growth and technological advances of a particular nation which is parallel with the RBV and KBV theories (Nonaka et.al., 2006). To elaborate further, according to Andreeva and Ikhilchik (2011) socialization, externalization, combination and internalization is a social process, where superior knowledge resource and capabilities is created through social interactions and integration between actors. To elaborate further, the literature highlighted socialization involved the activities of shared experience, mentoring, formal and informal joint activities and observations between actors i.e. conversion and interaction of tacit to tacit knowledge (Phelps et.al., 2012). Externalization refers to activities for example open dialogue and community of practice among actors on translating the tacit knowledge into explicit form for example metaphors, diagrams, models or prototypes (Gourlay, 2003). Combination refers to the social process of conversion and interaction of explicit to explicit knowledge in creating knowledge resource and capabilities by using information technologies, databases and video conferencing (Chatti et.al., 2007). Internalization involves creating superior knowledge and capabilities through empowerment, job rotation, learning by doing, trial and error, training, simulations and experiments i.e. conversion and interaction of explicit to tacit knowledge (Coff et.al., 2006).

According to the RBV theory, the resources and capabilities of an organization that fulfil the attributes of valuable, rareness, inimitable and no substitutes is importance in order to achieve sustainable competitive advantage and ultimately contributes towards improving the quality and quantity of people's life (lizuka, 2013). Similarly, the KBV theory proposed knowledge resource as the specific resource of an organization that can leads to unique competitive

advantage and subsequently enhance social innovation i.e. Social, economic and technological benefits (Lettice & Parekh, 2010). Drawing upon theory, the creation of valuable, rareness, inimitable and no substitutes of knowledge resource and capabilities that possess from the conversion and interaction of tacit and explicit knowledge resource within the social process of socialization, externalization, combination and internalization, is positively related to social innovation (Blomqvist & Levy, 2006). Nonaka (1991) explained that knowledge creation process i.e. socialization, externalization, combination and internalization, contributes towards social, economic and technological benefits by enhancing actors valuable knowledge resource, allows integration of community of practice within and across organization and enhance empowerment among actors (Lesser & Prusak, 1999; Bolisani & Scarso, 2014). These elements are then applied to create new solution towards developing superior products, processes and services that can be offered to the wider society and helped them to solve specific social, economic and technological problems (Kanter, 2013). For example, according to Nonaka & Takeuchi, (1995), many Japanese companies among others Honda, Canon and Matsushita had successfully created highly innovative products, processes and services through the implementation of knowledge creation process with other organization and subsequently producing products, processes and services that proven to be significant in providing social, economic and technological benefits to all stakeholder concerned (Nonaka et.al., 2000).

From the above paragraph, various previous studies for example Popadiuk and Choo, (2006), Nonaka and Von Krogh (2009), Andreeva and Ikhilchik (2011), Esterhuizen et. al., (2012) and Easa and Fincham (2012) had revealed that knowledge creation i.e. socialization, externalization, combination and internalization, and social innovation are positively related. This is because socialization, externalization, combination and internalization under the

process of knowledge creation produce superior knowledge resource which simultaneously enhances individual tacit and explicit knowledge resource within the socialization and internalization process through social integration and interaction. In addition, externalization and combination process enhance organization innovation capabilities by promoting the use of information technology, database and other systematic documents (Bratianu & Orzea, 2010). Through the efficient and effective use of information technology, database and other systematic documents by individual contribute towards creating new tacit and explicit knowledge resource for new innovation (Bratianu & Orzea, 2010). Furthermore, from the above studies, it can also be revealed that knowledge creation promotes high integration efforts of sharing tacit and explicit knowledge resource or community of practice that can enhance social capital among group of actors involved (Khuzaimah & Hassan, 2012). Moreover, knowledge creation process can improve actor's quality of working life by promoting active engagement of employee's participation within the process of knowledge creation; allow decentralised decision making and trial and error within the process of internalization (Fuller et.al., 2007). From the previous statements, the studies above positively associated knowledge creation with the non-technological elements which is in line with the objectives of social innovation (Senoo et.al., 2007). These non-technological elements is then used to facilitates organization in creating valuable, rareness, inimitable and no substitutes of knowledge resource and capabilities that can be embedded into products, processes and services. Furthermore, if organization successfully implements knowledge creation process i.e. socialization, externalization, combination and internalization, it will continuously offer society with better products, processes and services and massively contributes towards social innovation i.e. Social, economic and technological payoffs.

Other studies by Tsai and Goshal (1998) and McFadyen and Cannella, (2004) also provide evidence that knowledge creation process had a significant positive relation with social

capital. Their study examines new products development in the electronics and biomedical fields through the implementation of inter organization knowledge creation process. Inter organization knowledge creation process i.e. socialization, externalization, combination and internalization, involves direct social relationship among various actors that possess dynamic interplay of different tacit and explicit knowledge resource. These direct social relationships provide opportunity to other actors to access and leverage knowledge resource embedded within their relationship. Thus, knowledge creation process enhances actor's social capital and subsequently used to generate valuable, rareness, inimitable and no substitutes of knowledge resource and capabilities. Accordingly, the distinctive knowledge resource and capabilities contributes towards the creation of inimitable electronics and biomedical products which give a significant impact to the social well-being, economic growth and technological advances. Furthermore, studies by Peltonen and Lamsa (2004), Schulze and Hoegl (2008) and Exton and Totterdill (2009) states that knowledge creation process provides new novel solution and ideas i.e. new superior knowledge; that can be incorporated into products, processes and services and subsequently contribute towards organization sustainable competitive advantage and improves the quantity and quality of people's life. On the other hand, their studies also provide evidence that knowledge creation process have a positive relationship towards social innovation.

#### 3.2.1.1 Hypothesis Operational Definition- Knowledge Creation and Social Innovation

In order to operationalized the hypotheses of knowledge creation and social innovation developed in this study, based on the discussion of previous studies above, knowledge creation process i.e. socialization, externalization, combination and internalization; requires organizations to give full commitment by enabling the user of its system structure and organization explicit knowledge assets in order to create valuable, rareness, inimitable and no

substitutes of knowledge resource and capabilities, To explain further, knowledge creation process requires actor's full commitment through enabling their knowledge expertise i.e. tacit knowledge, cognitive skills and creative thinking. The combination of various organizations and actors commitment towards conversion and interaction of tacit and explicit knowledge in generating valuable, rareness, inimitable and no substitutes of knowledge resource and capabilities had leads to positive relationship and have significant contribution towards workplace innovation i.e. job satisfaction, enhance autonomy, workforce commitment and motivation and increase actor's self-esteem; organization innovation i.e. new administrative practises and social capital i.e. strong relationship and interconnection between actors through social integration and interaction and community of practice within and across organization boundaries. In this regards, they asserts that knowledge creation process enhance actor's social capital by adding value to the individual knowledge assets. Thus, the above studies show positive relationship between knowledge creation and social innovation. This indicates knowledge creation indeed benefited social aspects apart from economic value. Therefore, this study recommends the following hypothesis:



$H_1$: There is a significant positive relationship between socialization and workplace innovation

$H_2$: There is a significant positive relationship between externalization and workplace innovation

$H_3$: There is a significant positive relationship between combination and workplace innovation

$H_4$: There is a significant positive relationship between internalization and workplace innovation

$H_5$: There is a significant positive relationship between socialization and organization innovation

$H_6$: There is a significant positive relationship between externalization and organization innovation

$H_7$: There is a significant positive relationship between combination and organization innovation

$H_8$: There is a significant positive relationship between internalization and organization innovation

$H_9$: There is a significant positive relationship between socialization and social capital

$H_{10}$: There is a significant positive relationship between externalization and social capital

$H_{11}$: There is a significant positive relationship between combination and social capital

$H_{12}$: There is a significant positive relationship between internalization and social capital

### 3.2.2 Knowledge Transfer and Social Innovation

Within the literature, many researchers recognised that knowledge transfer is the most significant process of strategic knowledge management in obtaining valuable, rareness, inimitable and no substitutes of knowledge resource and capabilities for achieving new innovation, sustainable competitive advantage and organization performance which is parallel with the concept of RBV and KBV theory (Liyanage et.al., 2009; Meier, 2011). To elaborate further, according to Tidd et.al., (2001), Miller, (2012) and Abidin et.al., (2014) in the new economic environment many organizations encourage and emphasize on knowledge transfer process to be implemented within and across organizational boundaries in order to help organization to find better sites for their products, process and services commercialization and improves organization strategic planning in order to achieve maximum performance and productivity and subsequently contributes towards innovation and sustainable competitive advantage. Furthermore, many governments and policy makers throughout the world also placed knowledge transfer process as a vital program in their specific national agenda (Edler et.al., 2011).

Continuous from the above paragraph, one of the important measures and initiatives taken by governments and policy makers are by encouraging partnership and collaboration between

university-industry-community and other public research organizations (Abreu et.al., 2009; Perkmann et.al., 2011; Rossi & Rosli, 2014) to work together in providing valuable, rareness, inimitable and no substitutes of knowledge resource and capabilities that can be embedded into products, processes and services (Leydesdorff & Meyer, 2010). Knowledge transfer process within these partnership acting as a significant driving force for innovation and sustainable competitive advantage which in turn realised remarkable benefits to the wider society (Wright et.al., 2009). Moreover, Jiang and Li (2009), Foss et.al., (2010) and Abidin et.al., (2014) also stressed that, out of all strategic knowledge management processes i.e. knowledge creation, knowledge transfer and knowledge application, the most studied and empirically tested is knowledge transfer process and this is due to knowledge transfer process is more visible, easy to observe and to measures as compared to knowledge creation and application. Thus, the reasons above proven knowledge transfer process are the most significant process in achieving social innovation and sustainable competitive advantage of an organization and nation as a whole. However, various studies for example by McEvily and Chakravarthy, (2002); Van Wijk et.al., (2008); Martinkenaite, (2011); and Hasnain and Jasimuddin, (2012) identified barriers to knowledge transfer. These barriers comes from the perspectives of knowledge factors, source related factors, recipient related factors and relational related factors that may hinder organization and other stakeholders to possess valuable, rareness, inimitable and no substitutes of knowledge resource and capabilities that are prerequisite in achieving innovation and sustainable competitive advantage (Anatan, 2013; Audretsch & Caiazza, 2015).

According to Cumming and Teng (2003) and Li and Hsieh (2009) the successful of knowledge transfer process is mainly dependent upon the receiver obtained ownership, commitment and satisfaction with the transferred knowledge resource from sender.

Furthermore, Argote and Ingram, (2000) and Hasnain and Jasimuddin (2012) also asserts that effectiveness of knowledge transfer process i.e. knowledge communication and knowledge transformation; is achieved when the transferred knowledge resource is being absorbed and transform from one unit to another (Cohen & Levinthal, 1990; Zahra & George, 2002).

Many previous studies for example, Gilbert & Cordey-Hayes, (1996); Tsai, 2001; Caloghirou et.al., (2004); and Liao & Hu, (2007) had shown evidence that knowledge transfer had a significant positive relationship with innovation. According to Un et.al., (2010) knowledge transfer correlates with innovation through the generation of new superior knowledge resource that is embedded into new products, process and services and subsequently transform the products, processes and services to became superior as compared to the others. Furthermore, a study by West and Bogers (2014) based on open innovation approach found that external knowledge transfer process is proven more significant in providing valuable knowledge resource that leads to technological advances in products, processes and services and increases organization's technological innovativeness. Similarly, Perrini and Vurro (2006) and Christensen et.al., (2006), highlighted organization that implements knowledge transfer process within and across organization boundaries with a focus to solved wider social issues and to improves social needs i.e. social innovation, through superior products, processes and services is found to be more efficient and effectives than organization that specifically focus on commercial driven innovation. In continuous from the previous statement, in another study by Kanter (2013) explained that when organization addressing social issues and improved social needs within the process of knowledge transfer, organization is said making better use of its resources and its organization systems in terms of human resource, financial resource and full commitment and efforts of its organization structure. Moreover, according to Benneworth and Cunha (2015), when organization used

social innovation approach within its knowledge transfer process, they can realise a remarkable benefits not only from social aspects for example addressing social problems but also economic aspects i.e. sustainable competitive advantage, organization performance, profit maximization and technological advances. Thus, social innovation is regards as a new inspiration outcome for organization knowledge transfer process and also providing opportunity for organization to developed competitive ideas towards solving long standing social and business issues (Benneworth & Ratinho, 2014).

From the above paragraph, knowledge transfer process has the greatest potential in possessing valuable, rareness, inimitable and no substitutes of knowledge resource and capabilities in generating products, process and services that can enhance social innovation. Studies by Bramwell et.al., (2012), Rossi (2014), Gerbin and Drnovsek (2015), Audretsch & Caiazza, (2015) and Caiazza et.al., (2015) revealed that knowledge transfer process had a positive relationship with social innovation. According to these studies, knowledge transfer process within university-industry-community partnership had created abundance of new commercial entrepreneurship opportunity for organization extracting from valuable, rareness, inimitable and no substitutes of knowledge resource and capabilities. These superior knowledge resource and capabilities had created highly innovative products, process and services and subsequently contributes towards a remarkable growth of spins-out and start-up company. Furthermore, their studies also revealed that the increase of new commercial entrepreneurship activity that derived from university-industry-community knowledge transfer process positively effects social growth. These can be seen through the social spill-over effects within the regions that university-industry-community knowledge transfer partnership takes place. For example, Audretsch & Caiazza, (2015) cited the region of Bangalore in India experiencing a high increase of employment opportunity for the people within the region and

also achieving one of the highest growth rates of per-capita income throughout India national level. As a result, knowledge transfer process contributes towards improving the issue of poverty in India which is regards as the most critical social problems by Indian government (Audretsch, 2007; Audretsch & Caiazza, 2015).

According to RBV and KBV theories, the knowledge resource and capabilities of an organization that is superior from other resources is essential for social innovation and to the organization performance (Slusarek et.al., 2010). According to Tatibekov (2013), wider society benefited from knowledge transfer process of university-industry-community partnership, through the generation of valuable innovative products, process and services, enhance human resource value and also the development of new practical applications for addressing social, economic and technological problems. Krlev et.al., (2014) describe the above benefits as social innovation outcomes. Studies by Wilson (2012) and Abdul-Jalal et.al., (2013) made important contributions in linking knowledge transfer process with the social innovation. Their studies revealed that university-industry-community knowledge transfer partnership through the generation of superior knowledge resource and capabilities contributes towards various social growths. For example, improve wider community quality and quantity of life, enhance individual's actor knowledge and skills, adding value to the process of human resource practices, improves job satisfaction, motivation and sense of belonging among individuals and also support organization to achieve sustainable competitive advantage and performance by meeting its business needs.

### 3.2.2.1 Hypothesis Operational Definition- Knowledge Transfer and Social Innovation

In order to operationalized the hypotheses of knowledge transfer and social innovation developed in this study, previous studies among others by Cumming and Teng, (2003), Ko et.al., (2005), Todorova and Durisin (2007), Liyanage et.al., (2009), Miller (2012) highlighted that a good communication which refers to the ability to express idea clearly, have a good command in language and easily to understood and a good organizational structure, procedures and practises and also transformation which refers to the ability to leverage and convert new knowledge resource to create new innovation leads to positive relationship and have significant contribution towards workplace innovation i.e. job satisfaction, enhance autonomy, workforce commitment and motivation and increase actor's self-esteem; organization innovation i.e. new administrative practises and social capital i.e. strong relationship and interconnection between actors through social integration and interaction and community of practice within and across organization boundaries. Therefore, this study expects the following hypotheses:



$H_{13}$: Knowledge communication i.e. knowledge transfer is significantly positively related with workplace innovation

$H_{14}$: Knowledge transformation i.e. knowledge transfer is significantly positively related with workplace innovation

$H_{15}$: Knowledge communication i.e. knowledge transfer is significantly positively related with organization innovation

$H_{16}$: Knowledge transformation i.e. knowledge transfer is significantly positively related with organization innovation

$H_{17}$: Knowledge communication i.e. knowledge transfer is significantly positively related with social capital

$H_{18}$: Knowledge transformation i.e. knowledge transfer is significantly positively related with social capital

### 3.2.3 Knowledge Application and Social Innovation

The strategic knowledge management processes also acknowledged the importance of knowledge application in the context of social innovation. Knowledge application is the end process of strategic knowledge management that describe how knowledge resource is being applied into products, process and services and ultimately creates new innovation (Miller et.al., 2007; Nonaka & Von Krogh, 2009). Accordingly, Steensma and Lyles (2000) argued that valuable, rareness, inimitable and no substitutes of knowledge resource and capabilities are meaningless if the knowledge resource and capabilities cannot be applied to into products, processes and services. Therefore, knowledge application is vital and unique process which must be well understood in order to avoid and minimize the negative impact on its application towards producing highly innovative and superior products, processes and services (Akbar and Tzokas, 2013). At the core of RBV and KBV theories, knowledge application is a form of exploration i.e. application of knowledge to produce new products, processes, services; and exploitation i.e. application of knowledge to refine existing products, processes and services; (March, 1991). The successful application of knowledge resource into products, processes and services can be seen through the knowledge entrepreneurial activities for example patenting, licensing, spins-outs and start-up company (Breznitz, 2011). In line with the context of this study, according to Fritsch and Kauffeld-Monz (2010), knowledge application is the utilization and implementation of valuable, rareness, inimitable and no substitutes of knowledge resource and capabilities into new or improved products, processes and services

that subsequently enhance social well-being, social value, economic growth and technological advances.

In continuous with the above paragraph, Pratt and Loff (2012) highlighted in details about the knowledge application process i.e. exploration and exploitation, within the paradigm of social innovation in the healthcare industry. To elaborate further, the application of new knowledge resource within the university-industry-community partnership helps massively towards the establishment of superior medical products, processes and services that can prevent, diagnose and treat critical diseases that contributes towards enhances people's health (El Arifeen et.al., 2013). Furthermore, the result of new application of knowledge resource of healthcare industry also contributes towards affordable cost of healthcare, more accessibility of healthcare for all people in the community and a change in healthcare practice which leads to greater public awareness of health risks and benefits (Glasgow et.al, 2003). On the other hand, in terms of economic and technological aspects, the application of new knowledge resource in the healthcare industry also stimulates economic sectors for example within the insurance industry and other related businesses sector by contributing towards enhancing their commercial driven needs. Furthermore, Pratt and Loff (2012) also highlighted knowledge application process through the generation of new superior knowledge resource created within the platform of public and private partnership produced highly advanced technological products, processes and services within the healthcare industry which simultaneously gives particular organization the upper hand in regards to the competitiveness and sustainability advantage as compared to others.

From the above paragraph, Miller et.al., (2016) also identifies that the output of knowledge application within collaborative networks of quadruple helix model, i.e. university, industry,

government and community, is measured by the application and absorption of new knowledge resource and capabilities into producing highly innovative products, processes and services. These highly innovative products, processes and services effectively impact wider society in terms of social benefits, improve quality of life, provide economic benefits and as well as technological benefits. Thus, the knowledge application process is said ineffective and inefficient if the knowledge resource and capabilities embedded within products, processes and services does not provide any social, economic and technological impacts on society as a whole (Lavie et.al., 2010). Furthermore, many of the previous studies for example Mowery & Sampat, (2005); Bathelt et.al., (2010); Link et.al., (2011); Breznitz, (2011); Geiger, (2012); and Goldstein, et.al., (2015) had also shows that knowledge application process i.e. exploration and exploitation; had positive relationship with social innovation. Each of the study revealed that valuable, rareness, inimitable and no substitutes of knowledge resource and capabilities that are generated from university-industry-community partnership is used as a novel solution to creates highly innovative products, processes and services through academic entrepreneurial activities i.e. patenting and licencing. The commercialization of the products, processes and services which have a high value of technological advances subsequently contributed towards the creation of various Small and Medium Enterprise (SME). This as a result, generates and offers wider society new employment opportunity, enhancing human capital and individual knowledge value, improves prior knowledge and skills and also enhances organization social integrations and formalization of better quality and quantity of working life. Moreover, according to Zhang et.al., (2004), Howlett (2010), Hurmelinna-laukkanen et.al., (2012) and Cepeda-Carrion et.al., (2012), knowledge application process through the development of highly innovative and advance value of technological products, process and services in the area of biotechnology, medicine, electronics and chemical engineering and information technology fulfil the requirements of

wider society's needs, wants and preferences which subsequently improves society quantity and quality of life and enhance organization economic and technological performance.

#### 3.2.3.1 Hypothesis Operational Definition- Knowledge Application and Social Innovation

In order to operationalized the hypotheses of knowledge application and social innovation developed in this study, Kang et.al., (2007, Bierly et.al., (2009) and Capeda- Carion et.al., (2012) stated that a good exploration and exploitation ability within the process of knowledge application leads to enhance the effectiveness and efficiency of workplace innovation i.e. job satisfaction, enhance autonomy, workforce commitment and motivation and increase actor's self-esteem; organization innovation i.e. new administrative practises and social capital i.e. strong relationship and interconnection between actors through social integration and interaction and community of practice within and across organization boundaries. Therefore, this study expects the following hypotheses:

$H1_{19}$: Knowledge exploration i.e. knowledge application is significantly positively related with workplace innovation

$H_{20}$: Knowledge exploitation i.e. knowledge application is significantly positively related with workplace innovation

$H_{21}$: Knowledge exploration i.e. knowledge application is significantly positively related with organization innovation

$H_{22}$: Knowledge exploitation i.e. knowledge application is significantly positively related with organization innovation

$H_{23}$: Knowledge exploration i.e. knowledge application is significantly positively related with social capital

$H_{24}$: Knowledge exploitation i.e. knowledge application is significantly positively related with social capital

## 3.3 Theoretical Framework

Based on the review of the relevant related literature surrounding social innovation and strategic knowledge management processes i.e. knowledge creation, knowledge transfer and knowledge application, proposed theoretical framework has been developed. Furthermore, from this framework, research questions and objectives will be derived which will form the basis of for this study. This proposed theoretical framework is detailed in the figure 3.0 below:

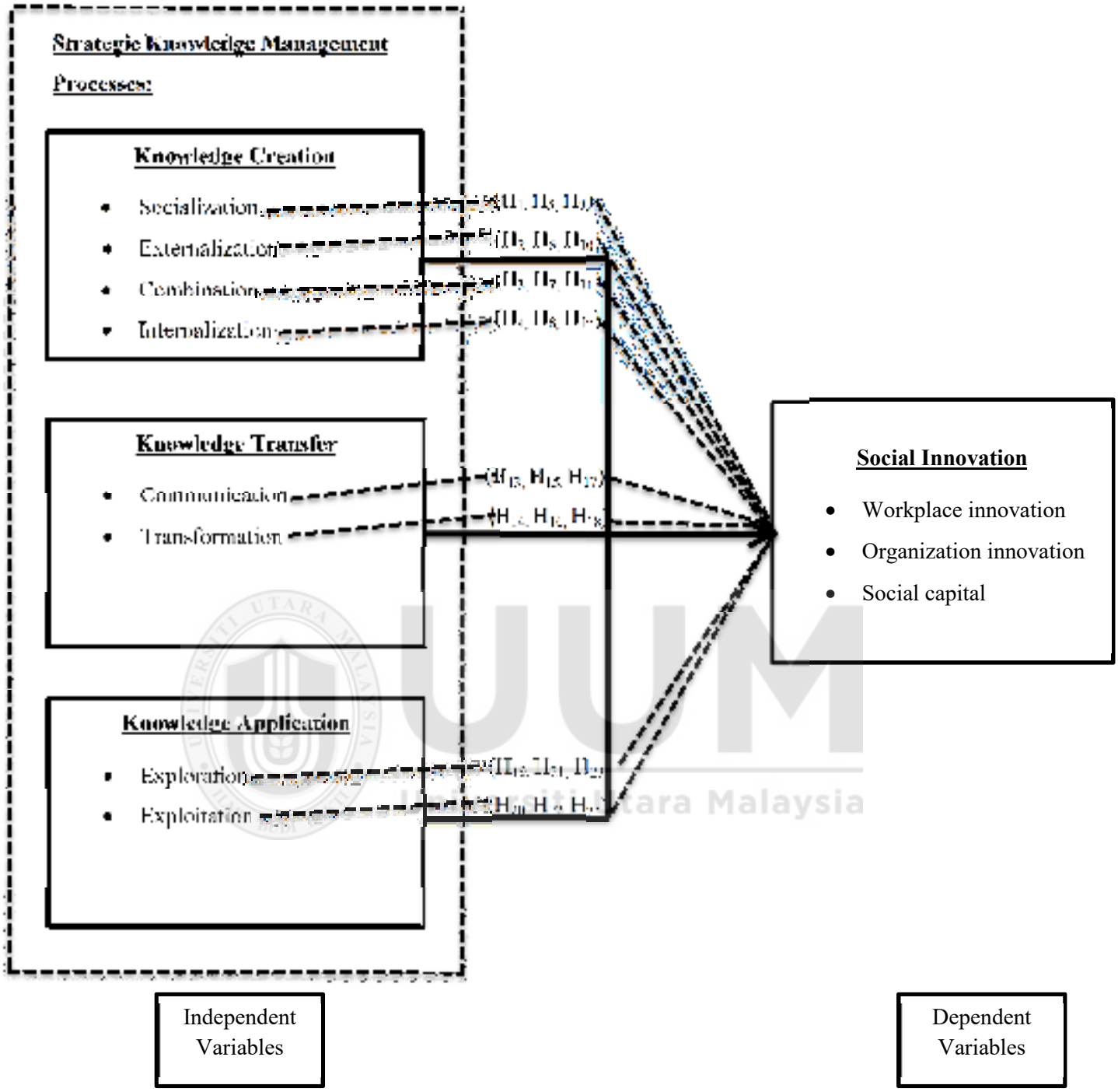



Figure 3.0
*Proposed Theoretical Framework*

According to the framework, social innovation as a dependent variable of the study was represent by its dimensions namely workplace innovation, organization innovation and social capital. Strategic knowledge management processes is representing by knowledge creation,

knowledge transfer and knowledge applications which identified as independent variables of the study. To elaborate further, knowledge creation process is represented by its dimensions namely socialization, externalization, combination and internalization. Knowledge transfer process is representing by communication and transformation and knowledge application process is representing by exploration and exploitation. The study focussed on the direct relationship between each dimension of independent and dependent variables.

The dependent variable used in the framework is the social innovation representing by workplace innovation, organization innovation and social capital. There is substantial amount of conceptual and empirical research within the literature highlighting the significant relationship between strategic knowledge management and technological driven innovation. However, social innovation is very much underdeveloped and received little attention in associations with strategic knowledge management processes (Cajaiba-Santana, 2014; Krlev, et.al., 2014; Makimattila et.al., 2015). Furthermore, very little research has examined social innovation with strategic knowledge management activities, particularly in the context of university-industry-community partnership (Benneworth & Cunha 2015). In addition, literature highlighted previous studies within the scope of social innovation mainly focus on pure social aspects. Therefore, the study considers social innovation as the dependent variable in order to examine it with strategic knowledge management processes. Based on the concept of RBV and KBV theories where valuable, rareness, inimitable and no substitutes of knowledge resources and capabilities as the important source of social innovation and sustainable competitive advantage. Strategic knowledge management processes representing by knowledge creation, knowledge transfer and knowledge application used as the independent variables to test the impact on the social innovation i.e. dependent variables, in the context of Malaysian university-industry-community partnership ecosystem. The first

important independent variable of the framework is knowledge creation which offers positive association with social innovation that based on the hypotheses building in the previous section. Therefore, the study expects to have the same relationship between each dimensions used between these two variables within Malaysian university-industry-community partnership ecosystem. The second independent variable used in the study is knowledge transfer. Previous studies had acknowledged that knowledge transfer process successfully addressed social, economic and technological issues through superior products, processes and services. Therefore, the framework of this study include knowledge transfer i.e. communication and transformation, to see and determined whether any association it has with social innovation in the context of Malaysian university-industry-community partnership ecosystem.

The third independent variable is the knowledge application i.e. exploration and exploitation, this process is dealing with how valuable, rareness, inimitable and no substitutes of knowledge resources and capabilities is being applied into products, processes and services. Successful knowledge application process offers wider society with better quality and quantity of life and enhances society satisfaction and therefore increase economic growth and technological advances. The achievement of social innovation was dependent hugely on knowledge application process. Thus, in the context of Malaysian university-industry-community partnership ecosystem it is important to see whether any association between knowledge application process i.e. exploration and exploitation with social innovation.

## 3.4 Summary of the Chapter

This chapter has described the underpinning theory, hypotheses development and theoretical framework used in this study. RBV and KBV theories explained that knowledge resources and capabilities that are valuable, rareness, inimitable and no substitutes is the foundation of innovation and sustainable competitive advantage. This study proposed research framework which contains of social innovation i.e. workplace innovation, organization innovation and social capital; as the dependent variables. Strategic knowledge management processes i.e. knowledge creation, knowledge transfer and knowledge application as the independent variables. The research framework has been justified with proper explanations and arguments. Based on the framework, as many as 24 hypotheses have been developed and tested using statistical tools. Next, chapter four will be discuss further on the research methodology of this study.

# CHAPTER FOUR

# RESEARCH METHODOLOGY

## 4.0 Introduction

This chapter presents the research methodology used in this study. This chapter will begin by discussing on research design. Next, data collection method is presented followed by population and sampling method. Furthermore, this chapter outline models and measurement method of dependent and independent variables, control variables and semi-structured interview protocol. This chapter also presents a summary of the analysis and findings of pilot study for both quantitative and qualitative method. Finally this chapter concludes with method of data analysis techniques and summary of the chapter.



## 4.1 Research Design

Research design is described as the detailed plan for a study that includes of samples, data collection method, measurements of all related variables and data analysis process in order to fulfil the research questions and objectives and to test the research hypotheses developed in this study (Kumar et.al., 2013). According to Saunders et.al., (2007), research design is a master plan and procedures of how researchers will go about in answering the research questions and objectives that have been set. This study focuses on answering the relationship between strategic knowledge management processes i.e. knowledge creation, knowledge transfer and knowledge application, on social innovation i.e. workplace innovation, organization innovation and social capital. This study is a correlational where it involves hypotheses testing in order to understanding the relationship between variables understudy. This study involves collection of data in a non-contrived setting which refers to the normal work environment of Malaysian university-industry-community partnership projects.

According to Burns and Burns (2008), correlational studies are normally conducted in a non-contrived setting of organizational environment. The unit of analysis for this study is the projects in the Malaysian university-industry-community partnership. The respondents involved are the actors in the Malaysian university-industry-community partnership projects. The data of this study were collected through quantitative research method namely structured questionnaires and supported by qualitative approach namely, semi-structured interview protocol and also involves some related documentations, statistical records and files of Malaysian university-industry-community partnership projects. This study is a sequential explanatory strategy in nature where the collection of data, analysis and findings of quantitative approach is regards as the main findings of any particular study (Creswell, 2013). Subsequently, the data, analysis and findings of qualitative approach are only to support, assist, explaining and add value to the main findings of quantitative approach. Therefore, with the explanations above this study adopts sequential explanatory research strategy.



## 4.2 Data Collection Method

Quantitative research method is often regards as a systematic empirical research that generates statistical and mathematical technique of analysis (Bryman & Bell, 2015). The study used quantitative research method in answering the majority of the research questions and objectives in order to examine the relationship between variables. It involves structured questionnaires as the medium of main data collection in this study. Furthermore, this study will also be supported by qualitative approach in answering the remainder of the research questions and objectives. Qualitative method is referred to the belief, experiences, attitude and perception of individuals towards particular research problems or issues (Kumar et.al., 2013). This study used semi-structured interview protocol as a medium in order to leverage a meaningful interpretative insight from the respondents under investigation (Cresswell, 2003).

Continue from the above statements, according to Zikmund et. al., (2012), survey method is a structured method which regards as the most significant and useful method in redefining research problems within the field of business and management (Hair et.al., 2007). This study follows survey method in answering the research questions and objectives. This study involves collection of primary data collected through structured questionnaires and semi–structured interview protocol from the overall projects of Malaysian university-industry-community partnership projects. Furthermore, this study also involves some collection of secondary data from related documentations, statistical records and files of Malaysian university-industry-community partnership. The secondary data is used to improve understanding with regards to answers the research questions and objectives.

The first data collection method of this study is through structured questionnaires. The purpose of these structured questionnaires is to examine the relationship of strategic knowledge management processes i.e. knowledge creation, knowledge transfer and knowledge application, on social innovation i.e. workplace innovation, organization innovation and social capital, within Malaysia university-industry-community partnership. According to Sekaran (2003), self-administered approach is the best way in collecting data through structured questionnaires. This study used personal and internet survey approach in distributing the structured questionnaires to the target respondents. Moreover, personal approach method in distributing structured questionnaires has the advantage of getting complete answered questionnaires within the short period of time and also can clarify any doubt arises immediately (Kumar et.al., 2013). Furthermore, this study used internet survey approach in order to reach respondents that lives in wide geographical area which is less expensive and fast transmission time (Hair, et.al., 2007).

The second data collection method is through semi-structured interview protocol. This involves face to face interview sessions with the expert's respondents that already being identified in order to answer the research questions and objectives namely; to explore the level of understanding among actors towards the association between strategic knowledge management processes and social innovation; and to identify actor's roles and key factors that potentially impedes the process of knowledge application within Malaysian university-industry-community partnership ecosystem in achieving social innovation. The collection of some secondary data is done through the secretariat of Malaysian university-industry-community partnership. This involves examining of Malaysian university-industry-community partnership policy, procedures and performance guideline, files and records of entire projects, performance of finish projects and on-going projects and also other statistical records. The purposed of collecting secondary data is to defining the population and sample of this study and also to determine the respondents of this study. Moreover, the used of secondary data is to improved understanding and adding value in answering the research objectives and questions of this study.



## 4.3 Population and Sampling Method

In general, population (N) is refers to the entire group of people, events, projects or things that researches wants to investigates (Kumar et.al., 2013). Furthermore, sampling (n) is part of the population or selecting the adequate amount of people, events, projects or things from its population (Sekaran, 2003). This study emphasis on the impacts of strategic knowledge management processes namely, knowledge creation, knowledge transfer and knowledge application on social innovation which represent by workplace innovation, organization innovation and social capital. Therefore, the proposed population of this study is the projects carried out by the Malaysian university-industry-community partnership in the RMK-10 that

runs from the period of 2011-2015. In the RMK-10, a total number of 459 partnership projects had been carried out which involves 20 public universities, industries and also community partners. The Malaysian university-industry-community partnership projects are the unit of analysis of this study.

From the above paragraph, this study involves two sets of data collection namely; 1) Structured questionnaires and 2) Semi-structured interview protocol. The study considers on selecting the entire population (N) of 459 Malaysian university-industry-community partnership projects in the RMK-10 (2011-2015) as the sample size (n) of this study for answering the structured questionnaires. To elaborate further, the 1st rolling project phase started in 2011 consists of 64 projects. The 2nd rolling project phase conducted in 2012 consists of 92 projects. Moreover, the 3rd rolling project phase started in 2013 consists of 120 projects. The 4th rolling project phase started in 2014 consists of 95 projects and finally the 5th rolling project phase started in 2015 consists of 88 projects. In summary, all 20 public universities comprises of 5 research universities (RU), 11 focus universities and 4 comprehensive universities, 321 industries partners and also 138 communities partners are involved. Total financial commitment is amounted to RM 64 million. The actors of Malaysian university-industry-community partnership projects comprises of: I) Project leader (university), II) Co-project leader (university), III) Graduate internship (university), IV) CEO/ Owner/ member of company (industry), V) Community member (community). A total of 459 respondents (459 projects X1 project leader representing of each project) will be answering the structured questionnaires distributed by the researcher of this study. This study choose project leader to answer the questionnaire because they have well-verse information regarding the project and they are the leading role within the project.

The second data collection is through semi-structured interview protocol in answering the two research objectives and questions namely; to explore the level of understanding among actors towards the association between strategic knowledge management processes and social innovation; and to identify actor's roles and key factors that can potentially impede the process of knowledge application within Malaysian university-industry-community partnership ecosystem in achieving social innovation. This study will choose twelve (12) actors to become the interviewee within the Malaysian university-industry-community partnership projects. The twelve (12) actors are represents by: I) Four (4) project leaders (university actors), II) Four (4) CEO/ Owner/ member of company (industry actors) and III) Four (4) Community member (community actors). This actor represents projects within the Research University (RU) namely; 1) RU 1, 2) RU 2, 3) RU 3, 4) RU 4, and 5) RU 5 with their respective industries and communities partners. The consideration of choosing the Malaysian university-industry-community partnership projects within the Malaysian research university is based on the justification that these projects received the highest amount of grant and also the projects is considered as high impact partnership project. These actors will be representing their partnership project and will be interviewed in getting the information and responds needed in order to answer the qualitative research questions and objectives. Therefore, for semi-structured interview protocol a total number of 12 respondents will be participating comprises of 12 interview sessions.

According to Hair et.al., (2007), judgement sampling can be defined as respondents or samples that are in the best position to provide with information that requires by researchers. Furthermore, judgment sampling is a group of experts with superior knowledge and information towards a particular issues or subject (Zikmund, 2000; Kumar et.al., 2013). Thus, selecting the project leaders, industry actors and community actors to participate in the

interview sessions is justified based on the fact that they are the experts group that have the superior knowledge, experience and information within the partnership that are required in answering the supporting qualitative research objectives and questions. Based on the simple rules of thumb of qualitative approach in conducting an interviews, Guest et.al., (2006) and Yin (2009) proposed that at least 12 interview sessions have to be conducted in order to ensure the adequate richness of qualitative data approach. Therefore, 12 interview sessions as proposed by this study are justified.

## 4.4 Models and Measurement Methods of Dependent and Independent Variables and Control Variables of the Study

The dependent variable of this study is social innovation representing by three dimensions namely: workplace innovation, organization innovation and social capital. Moreover, this study developed three main independent variables i.e. knowledge creation, knowledge transfer and knowledge application which involved eight dimensions namely: socialization, externalization, combination and internalization – Knowledge creation; communication and transformation – Knowledge transfer; and exploration and exploitation – Knowledge application. The study considers leadership, organization structure and human resource management as control variables for workplace and organization innovation. Trust and social ties is the control variables for social capital. Previous studies on social innovation mainly associated with the control variables mentioned above. The development of the above related variables is to answer the main objectives of this which is to examine the relationship of knowledge creation, knowledge transfer and knowledge application towards social innovation in the context of Malaysian university-industry-community partnership.

### 4.4.1 Models 1, Model 2 and Model 3

Figure 4.0 shows the details of **Model 1**- Workplace innovation, strategic knowledge management processes i.e. knowledge creation, knowledge transfer and knowledge application and its control variables; **Model 2** – Organization innovation, strategic knowledge management processes i.e. knowledge creation, knowledge transfer and knowledge application and its control variables; and **Model 3** – Social capital, strategic knowledge management processes i.e. knowledge creation, knowledge transfer and knowledge application and its control variables.

**Figure 4.0**

**Model 1 = Workplace Innovation, Knowledge Creation, Knowledge Transfer, Knowledge Application and Control Variables**

$$WI = \alpha + \beta_1 Soc_i + \beta_2 Ext_i + \beta_3 Comb_i + \beta_4 Int_i + \beta_5 Comm_i + \beta_6 Trans_i + \beta_7 Explo_i + \beta_8 Exploit_i + \beta_9 Lead_i + \beta_{10} Orgstruct_i + \beta_{11} HRM_i + \bar{e}$$

WI = Workplace Innovation



| Knowledge Creation | Knowledge Transfer | Knowledge Application |
|---|---|---|
| $\beta_1 Soc_i$ = Socialization | $\beta_5 Comm_i$ = Communication | $\beta_7 Explo_i$ = Exploration |
| $\beta_2 Ext_i$ = Externalization | $\beta_6 Trans_i$ = Transformation | $\beta_8 Exploit_i$ = Exploitation |
| $\beta_3 Comb_i$ = Combination | | |
| $\beta_4 Int_i$ = Internalization | | |

Control Variables

| | |
|---|---|
| $\beta_9 Lead_i$ = Leadership | $\beta_{11} HRM_i$ = Human Resource Management |
| $\beta_{10} Orgstruct_i$ = Organizational structure | $\alpha$ = Constant $\bar{e}$ = Error term |

**Model 2 = Organization Innovation, Knowledge Creation, Knowledge Transfer, Knowledge Application and Control Variables**

$$OI = \alpha + \gamma_1 Soc_i + \gamma_2 Ext_i + \gamma_3 Comb_i + \gamma_4 Int_i + \gamma_5 Comm_i + \gamma_6 Trans_i + \gamma_7 Explo_i + \gamma_8 Exploit_i + \gamma_9 Lead_i + \gamma_{10} Orgstruct_i + \gamma_{11} HRM_i + \bar{e}$$

OI = Organization Innovation

| Knowledge Creation | Knowledge Transfer | Knowledge Application |
|---|---|---|
| $\gamma_1 Soc_i$ = Socialization | $\gamma_5 Comm_i$ = Communication | $\gamma_7 Explo_i$ = Exploration |
| $\gamma_2 Ext_i$ = Externalization | $\gamma_6 Trans_i$ = Transformation | $\gamma_8 Exploit_i$ = Exploitation |
| $\gamma_3 Comb_i$ = Combination | | |
| $\gamma_4 Int_i$ = Internalization | | |

Control Variables

$\gamma_9 Lead_i$ = Leadership $\gamma_{11} HRM_i$ = Human Resource Management

$\gamma_{10} Orgstruct_i$ = Organizational structure

$\alpha$ = Constant $\bar{e}$ = Error term

**Model 3 = Social Capital, Knowledge Creation, Knowledge Transfer, Knowledge Application and Control Variables**

$$SC = \alpha + \lambda_1 Soc_i + \lambda_2 Ext_i + \lambda_3 Comb_i + \lambda_4 Int_i + \lambda_5 Comm_i + \lambda_6 Trans_i + \lambda_7 Explo_i + \lambda_8 Exploit_i + \lambda_9 Trust_i + \lambda_{10} Socties_i + \bar{e}$$

SC = Social Capital

| Knowledge Creation | Knowledge Transfer | Knowledge Application |
|---|---|---|
| $\lambda_1 Soc_i$ = Socialization | $\lambda_5 Comm_i$ = Communication | $\lambda_7 Explo_i$ = Exploration |
| $\lambda_2 Ext_{it}$ = Externalization | $\lambda_6 Trans_i$ = Transformation | $\lambda_8 Exploit_i$ = Exploitation |
| $\lambda_3 Comb_i$ = Combination | | |
| $\lambda_4 Int_i$ = Internalization | | |

Control Variables

$\lambda_9 Trust_i$ = Trust

$\lambda_{10} Socties_i$ = Social ties

$\alpha$ = Constant $\bar{e}$ = Error term

### 4.4.2 Questionnaires items for Dependent, Independent and Control Variables

Table 4.0, 4.1 and 4.2 highlighted the details of questionnaires in measuring workplace innovation, organization innovation and social capital and its respective sources. Five-point likert scale will be utilised in measuring the questionnaires, ranging from the highest 5 point- Strongly agree to the lowest point 1- Strongly disagree.

Table 4.0

*Item measuring Workplace Innovation*

| No | Dependent variable | No. of questions/ Ave. Cronbach's alpha value (α) | Question items | Sources |
|---|---|---|---|---|
| A1 | Workplace innovation | 6 (0.75) | 1. Project management team allows work autonomy, empowerment and flexible working schedule. | Erickson & Jacoby (2003); Exton & Totterdill (2009); Oeij et.al, (2012); McMurray et.al., (2013); De kok et.al., (2014). |
| A2 | | | 2. Project actors frequently work through partnership forum and team work. | |
| A3 | | | 3. Project management team constantly updating project process and allow job rotation among actors. | |
| A4 | | | 4. Project management team concern on the welfare and social security of the actors. | |
| A5 | | | 5. Project leader provide individual support in enhancing actors human resource value through training, sharing knowledge and stimulate learning culture among actors. | |
| A6 | | | 6. The project outcome creates new solution, techniques and methods towards improving products, processes and services. | |

Table 4.1
*Item measuring Organization Innovation*

| No | Dependent variable | No. of questions/ Ave. Cronbach's Alpha value (α) | Question items | Sources |
|---|---|---|---|---|
| A7 | Organization innovation | 6 (0.80) | 7. The project management team allows decentralised decision making and flexible job responsibilities. | Mol & Birkinshaw (2009); Garcia-Morales et.al, (2012); Jiang et.al., (2012); Ganter & Hecker, (2013); Camison & Villar-Lopez (2014); Sanzo Perez et.al., (2015). |
| A8 | | | 8. The project management team constantly encourage actor's social relationship as a medium to enhance social value and propensity to innovate towards project objective. | |
| A9 | | | 9. The project management team implement best practices and provide convenient environment throughout project duration to enhance actor's motivation, performance and participation. | |
| A10 | | | 10. The project management team constantly emphasizes on actor's integration between each other and working as a unit throughout project duration. | |
| A11 | | | 11. The project management team often restructure and redesign project process and structure to adapt to changes during the project duration. | |
| A12 | | | 12. The project management team often implement new administrative system to make the project more efficient and effective throughout the duration of the project. | |

Table 4.2
*Item measuring Social Capital*

| No | Dependent variable | No. of questions/ Ave. Cronbach's Alpha value (α) | Question items | Sources |
|---|---|---|---|---|
| A13 | Social capital | 5 (0.80) | 13. All actors in the project shared the same belief, motives and goals towards the success of the project. | Lochner et.al., (1999); Narayan & Cassidy, (2001); Oh et.al., (2004); Martinez-Canas et.al.,(2012); |
| A14 | | | 14. All actors in the project are highly trusted and have a high sense of trustworthiness in sharing knowledge. | |
| A15 | | | 15. All actors in the project have close social relationship (example: recreational activities, informal gathering) with each other. | |
| A16 | | | 16. All actors frequently shared any knowledge and information regarding project matters with each other's to improve skills and capabilities. | |
| A17 | | | 17. New solution that can be embedded into products, processes and services is created from shared resources of project actors relationships. . | |



Table 4.3 show the details of questionnaires in measuring knowledge creation, knowledge transfer and knowledge application for model 1, model 2 and model 3 and its sources. Five-point likert scale will be utilised in measuring the questionnaires, ranging from the highest 5 point- Strongly agree to the lowest point 1- Strongly disagree.

Table 4.3

*Item measuring Knowledge Creation, Knowledge Transfer and Knowledge Application for Model 1, Model 2 and Model 3*

| No. | Dimensions of knowledge creation | Item no./ Ave. Cronbach's Alpha value (α) | Question items | Sources |
|---|---|---|---|---|
| B18 | Socialization | 4 (0.75) | 18. All project actors spent a lot of time interacting through informal meeting and social activities in order to discuss and exchange ideas, experience and opinion. | Nonaka, (1994); Nonaka et.al., (2000); Popadiuk & Choo, (2006); Schulze & Hoegl (2006, 2008); Martin de Castro et.al., (2008); Esterhuizen et.al., (2012); Von Krogh et.al., (2012). |
| B19 | | | 19. The project management team allows sharing experience, observation, imitation and mentoring activities. | |
| B20 | | | 20. Project leader always encourage, motivate and guiding other project actors to have a formal and informal joint activities i.e. open dialogue, spending time together to share experience. | |
| B21 | | | 21. The environment within the project, take place in a high level of trust, interpersonal relationship, openness and low level of cultural and language differences. | |
| B22 | Externalization | 4 (0.75) | 22. All project actors participate in open dialogue and community of practice with each other to structure and record knowledge. | |
| B23 | | | 23. All project actors have a high sense of trust, high degree of communication, social closeness and shared values. | |
| B24 | | | 24. The project leader/ project management team listens to all opinions and recommendations from every project actors. | |
| B25 | | | 25. All project actors keep new knowledge in documentation i.e. database, intranet files and other computer software, that are easy to understand and shared to others. | |

Table 4.3 (Continued)

| No. | Dimensions of knowledge creation | Item no./ Ave. Cronbach's Alpha value (α) | Question items | Sources |
|---|---|---|---|---|
| B26 | Combination | 4 (0.75) | 26. All project actors know very well about their roles and responsibility and have a positive attitude towards ICT. | Nonaka, (1994); Nonaka et.al., (2000); Popadiuk & Choo, (2006); Schulze & Hoegl (2006, 2008); Martin de Castro et.al., (2008); Esterhuizen et.al., (2012); Von Krogh et.al., (2012). |
| B27 | | | 27. The project management team equip actors with good ICT facilities and allow actors to access other related facilities. | |
| B28 | | | 28. All project actors are ICT literate in order to reconfigure, diffuse and systemize new knowledge. | |
| B29 | | | 29. All project actors frequently used ICT facilities in order to communicate and disseminate new knowledge to other actors. | |
| B30 | Internalization | 4 (0.75) | 30. Project explicit knowledge is written in comprehensive and well-structured documents. | |
| B31 | | | 31. The project always engages with practical activities such as learning by doing, experimenting, training and simulation. | |
| B32 | | | 32. Project leader always tolerates failures and continuously encourage trial and error. | |
| B33 | | | 33. Practical activities enhance all project actors tacit and personal knowledge. | |

Table 4.3 (Continued)

| No. | Dimensions of knowledge transfer | Item no./ Ave. Cronbach's Alpha value (α) | Question items | Sources |
|---|---|---|---|---|
| B34 | Communication | 5 (0.85) | 34. All project actors frequently communicate new knowledge with each other through verbal and non-verbal approach. | Van den Hooff & De Ridder, (2004); Xu & Ma, (2008); Camison & Fores, (2010); Flatten et.al., (2011); Plewa et.al., (2013); Cegarra-Navarro et.al., (2014); Wensley & Cegarra-Navarro (2015). |
| B35 | | | 35. All project actors regularly donating and collecting new knowledge with each other. | |
| B36 | | | 36. All project actors can communicate with each other effectively and efficiently. | |
| B37 | | | 37. All project actors can express new knowledge and ideas clearly. | |
| B38 | | | 38. Project leader always play as a leading role in established a constructive communication climate throughout project duration. | |
| B39 | Transformation | 5 (0.85) | 39. All project actors have the ability to transform new knowledge into practical work. | |
| B40 | | | 40. All project actors record and store new knowledge for future reference. | |
| B41 | | | 41. All project actors are capable to absorb new knowledge and prepare it for further purposes and to make it available. | |
| B42 | | | 42. All project actors aware of their competencies to eliminate obsolete old knowledge and replace it with newly acquired knowledge for new innovation. | |
| B43 | | | 43. All project actors regularly meet to discuss on the progress of transformation and utilisation of new acquired knowledge towards products, processes and services development. | |

Table 4.3 (Continued)

| No. | Dimensions of knowledge application | Item no./ Ave. Cronbach's Alpha value (α) | Question items | Sources |
|---|---|---|---|---|
| B44 | Exploration | 5 (0.85) | 44. The project invents and introduces new products, processes and services that are completely new. | Song et.al., (2005); Jansen et.al., (2006); Bierly et.al., (2009); Lichtenthaler, (2009); Camison & Fores, (2010); Cepeda-Carrion et.al., (2012). |
| B45 | | | 45. The project leader regularly organised special meeting with other actors to acquire new knowledge. | |
| B46 | | | 46. All project actors accept instruction that go beyond existing policy and procedures to develop new products, processes and services. | |
| B47 | | | 47. The project management team thoroughly observed technological trends and public demands throughout project duration. | |
| B48 | | | 48. Project actors frequently utilised new knowledge opportunity throughout project duration. | |
| B49 | Exploitation | 6 (0.85) | 49. The project frequently implements adaption of new knowledge towards existing products, processes and services. | |
| B50 | | | 50. The project improves existing products, processes and services within the project. | |
| B51 | | | 51. Project leader regularly review the development of products, processes and services to exploit of new knowledge. | |
| B52 | | | 52. All project actors are capable of recognising the usefulness of new knowledge to combine with existing knowledge within the project. | |
| B53 | | | 53. All project actors are capable in sharing new knowledge to improve and refine existing products, processes and services. | |
| B54 | | | 54. It is clearly known among actors how activities within the project should be performed. | |

Table 4.4 and 4.5 show the details of questionnaires in measuring control variables for model 1, model 2 and model 3 and their sources respectively. Five-point likert scale will be utilised in measuring the questionnaires, ranging from the highest 5 point- Strongly agree to the lowest point 1- Strongly disagree.

Table 4.4

*Items for measuring Control Variables in Model 1 (Workplace Innovation) and Model 2 (Organization Innovation)*

| No | Control variables | Item no./ Ave. Cronbach's Alpha value (α) | | Question items | Sources |
|---|---|---|---|---|---|
| C55 | Leadership | 5 (0.80) | 55. | Project leader articulates clear project vision, mission and objectives to other actors. | Jansen et.al., (2009): Garcia-Morales et.al., (2008); Garcia-Morales et.al., 2012); Von Krogh et.al., (2012); McMurray et.al., (2013). |
| C56 | | | 56. | Project leader regularly help other actors to increase level of enthusiasm and intellectual stimulation. | |
| C57 | | | 57. | Project leader always capable in giving inspirational motivation and guiding other actors to perform related job. | |
| C58 | | | 58. | Project leader frequently initiate meeting and leading discussion on any particular issues arise in the project. | |
| C59 | | | 59. | Project leader always guide other actors to look at problems from many different angle. | |
| C60 | Organizational structure | 5 (0.70) | 60. | Our project management team provides other actors with easy access to various sources of information. | Wan et.al., (2005); Crossan & Apaydin (2010); Camison & Villar-Lopez, (2014). |
| C61 | | | 61. | Our project management team allows decentralised decision making made by the project actors. | |
| C62 | | | 62. | Our project management team/ KTP project secretariat provides adequate resources (ex. financial and non-financial) for actors to think of creative solution and to explore innovative ideas. | |
| C63 | | | 63. | Our project management team/ KTP project secretariat holds innovative actors and projects in high regard. | |
| C64 | | | 64. | Our project management team/ KTP project secretariat is tolerant of mistakes. | |

Table 4.4 (Continued)

| No | Control variables | Item no./ Ave. Cronbach's Alpha value (α) | Question items | Sources |
|---|---|---|---|---|
| C65 | Human resource management | 5 (0.75) | 65. Project actors were rigorously recruited by the project leader in hiring process. | Damanpour, (1991); Jiang et.al., (2012); Yesil & Sozbilir (2013) |
| C66 | | | 66. The project management team frequently provide continuous developmental training opportunities for project actors. | |
| C67 | | | 67. Our project encourages empowerment and high participation among actors. | |
| C68 | | | 68. Our project activities involve a lot of teamwork rather than individual work. | |
| C69 | | | 69. Our project management team/ KTP project secretariat regularly rewards and appraised project actors when they perform excellently | |

Table 4.5

*Items for measuring Control Variables for Model 3 (Social Capital)*

| No | Control variables | Item no./ Ave. Cronbach's Alpha value (α) | | Question items | Sources |
|---|---|---|---|---|---|
| C70 | Trust | 5 (0.80) | 70. | We strongly believed that every project actor would not try to take advantage with each another. | Glaeser et.al., (1999); |
| C71 | | | 71. | We strongly believed that every project actor keep their words and promises with regards to project matters. | Becerra et.al., (2008); |
| C72 | | | 72. | We strongly believed that our welfare, desire and needs are priority to the project management team/ KTP project secretariat. | |
| C73 | | | 73. | We feel very confident on every project team actor capabilities towards achieving project objectives. | |
| C74 | | | 74. | All project actors have benefited from this partnership. | |
| C75 | Social Ties | 4 (0.75) | 75. | Our project actors frequently having a formal and informal face to face meeting with each other. | Chatti et.al., (2007); |
| C76 | | | 76. | We frequently discuss in person with other actors regarding project matters rather than looking at documents for information. | Hotho et.al., (2012); Panahi et.al., (2012); |
| C77 | | | 77. | We frequently meet outside the project formal activities to socialise and discuss with each other. | Aalbers et.al., (2014); |
| C78 | | | 78. | Our project actors regularly used other method such as social media to interact with each other. | |

### 4.4.3 Dependent Variable

The dependent variable of the study is social innovation. Social innovation will be represent by three dimensions namely; Workplace innovation, organization innovation and social capital. This study considers the aforementioned dimensions in order to capture the broad concept and measurement of social innovation and to improved focus on operationalizing and measuring social innovation.

#### 4.4.3.1 Workplace Innovation

Workplace innovation is the example of social innovation dimension which involves strategic innovation that refers to the combination of business, technological and social orientation (Totterdill et,al, 2012; De Kok et.al., 2014). The study considers 6 items in measuring workplace innovation involves the aspect of new product development, quality of working life, social value and collaborative work (Pot & Koningsveld, 2009; European Commission, 2014). These 6 items measures are adapted from Erickson & Jacoby (2003), Exton & Totterdill (2009), Oeij et.al, (2012), McMurray et.al., (2013) and De kok et.al., (2014). Five-point likert scale will be utilised in measuring the questionnaires, ranging from the highest 5 point- Strongly agree to the lowest point 1- Strongly disagree.

#### 4.4.3.2 Organization Innovation

According to Hage (1999), Ambruster et.al., (2008) and Camison & Villar-Lopez (2014), organization innovation is similar with social innovation since both consistently adopts social impact as an outcome. Mumford (2002), Lam (2004), Damanpour et.al., (2009) and Ganter and Hecker (2013) highlighted organization innovation replicates social innovation through the development of new administrative practices that creates new innovation into products, processes and services towards improving social and economic value. This can be achieved through social

integration and collaborative networks structure (Camison & Villar-Lopez, 2014). Organization innovation is measured by using 6 measurement items adapted from the previous studies by Mol & Birkinshaw (2009), Garcia-Morales et.al, (2012), Jiang et.al., (2012), Ganter & Hecker, (2013), Camison & Villar-Lopez (2014) and Sanzo Perez et.al., (2015). Five-point likert scale will be utilised in measuring the questionnaires, ranging from the highest 5 point- Strongly agree to the lowest point 1- Strongly disagree.

#### 4.4.3.3 Social Capital

The third dimension of social innovation is social capital. This study define social capital as social, relational and cognitive structure among individuals, networks and broader community that enhance social value and produce better public goods towards wider citizens (Putnam, 2001). According to Adam and Hess (2010) and Grimm et.al., (2013), social capital can be seen as the replication of social innovation through its social collaborative networks that produce valuable resources, hence creates technological innovation in the form of superior products, processes and services subsequently improved social, economic and human capital value (Manning, 2010). Focusing on social trust, social ties and trustworthiness, 5 items will be used to measures social capital that is adapted from the previous studies of Lochner et.al., (1999), Narayan & Cassidy, (2001), Oh et.al., (2004) and Martinez-Canas et.al.,(2012). Five-point likert scale will be utilised in measuring the questionnaires, ranging from the highest 5 point- Strongly agree to the lowest point 1- Strongly disagree.

### 4.4.4 Independent Variables

The independent variables of the study is knowledge creation, knowledge transfer and knowledge application. Knowledge creation will be representing by socialization, externalization,

combination and internalization. Knowledge transfer will be representing by communication and transformation. Knowledge application will be representing by exploration and exploitation.

#### 4.4.4.1 Knowledge Creation (Socialization ($IV_1$), Externalization ($IV_2$), Combination ($IV_3$), Internalization ($IV_4$)

Knowledge creation is the first independent variable of this study. Knowledge creation is representing by socialization, externalization, combination and internalization dimensions. These dimensions explained the creation of superior knowledge resource from the two type of knowledge namely tacit and explicit knowledge. Knowledge creation will be measured by using 16 questionnaires adapted from past studies done by Nonaka et.al., (1994), Nonaka et.al., (2000), Popadiuk & Choo, (2006), Schulze & Hoegl (2006, 2008), Martin de Castro et.al., (2008), Esterhuizen et.al., (2012) and Von Krogh et.al., (2012). The questionnaires had been modified tailored to the scenario and the objectives of this study. Based on the studies by Popadiuk and Choo, (2006), Nonaka and Von Krogh (2009), Andreeva and Ikhilchik (2011), Esterhuizen et.al., (2012) and Easa and Fincham (2012) revealed that knowledge creation i.e. socialization, externalization, combination and internalization, and social innovation are positively related. Therefore, this study also predicts the same positive outcome between knowledge creation and social innovation. Five-point likert scale will be utilised in measuring the questionnaires, ranging from the highest 5 point- Strongly agree to the lowest point 1- Strongly disagree.

#### 4.4.4.2 Knowledge Transfer (Communication ($IV_5$), Transformation ($IV_6$)

Knowledge transfer is representing by communication and transformation. The study defines this variable as the transmission of knowledge from one to another (Argote & Ingram, 2000). Knowledge transfer is measures by using 10 items adapted from previous studies by Van den Hooff & De Ridder, (2004), Xu & Ma, (2008), Camison & Fores, (2010), Flatten et.al., (2011), Plewa et.al., (2013), Cegarra-Navarro et.al., (2014) and Wensley & Cegarra-Navarro (2015).

Various previous studies among others by Bramwell et.al., (2012), Gerbin and Drnovsek (2014), Rossi (2014), Audretsch & Caiazza, (2015) and Caiazza et.al., (2015) revealed that knowledge transfer process had a positive relationship with social innovation. Thus, this study makes the same prediction of positive relationship between knowledge transfer and social innovation based on the results and justification of the previous studies. Five-point likert scale will be utilised in measuring the questionnaires, ranging from the highest 5 point- Strongly agree to the lowest point 1- Strongly disagree.

#### 4.4.4.3 Knowledge Application (Exploration ($IV_7$), Exploitation ($IV_8$)

The third independent variable is knowledge application. Knowledge application is refers to application of knowledge to produce new products, processes and services (Gupta et.al., (2006) and to refine and improved existing products, processes and services (He & Wong, 2004). The measurement of knowledge application is adapted through studies by Song et.al., (2005), Jansen et.al., (2006), Bierly et.al., (2009), Lichtenthaler, (2009), Camison & Fores, (2010) and Capeda-Carrion et.al., (2012). The study adapted 11 items to measures knowledge application i.e. exploration and exploitation. Based on previous study by Mowery & Sampat, (2005), Bathelt et.al., (2010), Breznitz, (2011), Geiger, (2012) and Goldstein, et.al., (2013), knowledge application process i.e. exploration and exploitation had positive relationship with social innovation. Therefore, this study also predicts the same positive relationship between knowledge application and social innovation. Five-point likert scale will be utilised in measuring the questionnaires, ranging from the highest 5 point- Strongly agree to the lowest point 1- Strongly disagree.

### 4.4.5 Control Variables (Leadership, Organization structure, Human resource management, Trust and Social ties)

This study considers five important control variables namely leadership, organizational structure, human resource management, trust and social ties. Leadership, organization structure, human resource management have been frequently studied with workplace innovation and organization innovation. Trust and social ties variables are well established variables with social capital.

#### 4.4.5.1 Leadership

Various empirical studies have examining leadership to find out its relationship with workplace and organization innovation. According to study by McMurray et.al., (2013), a good transformational and transactional leadership directly promotes workplace and organization innovation. Jung et.al., (2003), Gumusluoglu and Ilsev (2009), Crossan and Apaydin (2010), Garcia- Morales et.al., (2012) examining the role of leadership towards enhancing workplace and organization innovation. All of their studies found that transformational leadership style has a positive relationship towards workplace and organization innovation by practises of empowerment, enhance creative thinking and guiding motivation. This study used 5 items in measuring leadership adapted from previous studies of Jansen et.al., (2009), Garcia-Morales et.al., (2008; 2012), Von Krogh et.al., (2012) and McMurray et.al., (2013). This study predicts leadership have a positive relationship with social innovation. The respondents will be asked about leadership by using five-point likert scale, ranging from the highest 5 point- Strongly agree to the lowest point 1- Strongly disagree.

#### 4.4.5.2 Organization Structure

Many empirical studies have conducted in examining the relationship of organization structure and workplace and organization innovation. Studies by Damanpour, (1991), Hage (1999), Frambach & Schillewaert, (2002), Wan et.al., (2005), Wineman et.al., (2009), Polder et.al.,

(2010), Von Treuer and McMurray (2012) revealed that organization structure that promotes autonomy, decentralization, adequate resources, professionalism, complexity of skills labour, investment in information technology and cognitive learning have a strong positive relationship with workplace and organization innovation. Organization structure is measured by using 5 items adapted from the studies by Wan et.al., (2005), Crosson & Apaydin (2010) and Camison & Villar-Lopez, (2014). Thus, this study predict organization innovation have a positive relationship with social innovation. The respondents will be asked about organization structure by using five-point likert scale, ranging from the highest 5 point- Strongly agree to the lowest point 1- Strongly disagree.

#### 4.4.5.3 Human Resource Management

Human resource management is another important variable that affect workplace and organization innovation. According to Verma (2014) human resource management which involves the processes of hiring and selection, rewards, job design and teamwork enhance employee's creativity towards achieving workplace and organization innovation. Studies by Kim and Bae (2005), Jiang et.al., (2012) Yesil and Sozbilir (2013) and Totterdill and Exton (2014) shows evidence that good human resources management have a strong positive relationship with workplace and organization innovation. 5 items is used to measure human resource management adapted from studies by Damanpour, (1991), Jiang et.al., (2012) and Yesil and Sozbilir (2013). This study predicts human resource management have a positive relationship with social innovation. The respondents will be asked about human resource management by using five-point likert scale, ranging from the highest 5 point- Strongly agree to the lowest point 1- Strongly disagree.

#### 4.4.5.4 Trust

Trust factor have been tested with social capital by many empirical studies within sociology and strategic management literature. According to Yli-Renko et.al., (2001), Bolino et.al., (2002) and Zahra and George (2002) when there is high level of trust within members help to creates effective and efficient relationship and working environment and thus reduce barriers to individuals and organization in possessing new resources. Therefore, trust enhances social capital within collaborative network structures (Vega-Jurado et.al., 2008). Previous studies by Nahapiet and Ghoshal (1998), Glaeser et.al., (1999), Beccera et.al., (2008) and Lee et.al., (2008) shows that trust positively facilitates social capital. 5 items used to measures trust adapted from previous studies by Glaeser et.al., (1999) and Becerra et.al., (2008). Therefore, this study predicts trust have a positive relationship with social innovation. The respondents will be asked about trust by using five-point likert scale, ranging from the highest 5 point- Strongly agree to the lowest point 1- Strongly disagree.



#### 4.4.5.5 Social Ties

Social ties have also received a great deal of attention within the scope of social capital. According to Bell and Zaheer (2007), various studies show that social ties are an important factor that largely affects social capital. Social ties refer to formal and informal interaction and relationship for example, face to face communication, social media interactions and other social activities integrations (Inkpen & Tsang, 2005). When members within an organization or community members frequently met with each other and socialised among them, creates high level of connectedness and this in turn enhances social capital (Maurer, 2010). Empirical studies by Oh et.al., (2004), Balkundi and Harrison (2006), Berggren et.al., (2006) and Berggren and Bjornskov (2011) found that social ties enhance and have a positive relationship with social capital. This study measured social ties by using 4 items adapted from studies by Chatti et.al.,

(2007), Hotho et.al., (2012), Panahi et.al., (2012) and Aalbers et.al., (2014). This study makes a prediction that social ties have a positive relationship with social capital. The respondents will be asked about trust by using five-point likert scale, ranging from the highest 5 point- Strongly agree to the lowest point 1- Strongly disagree.

### 4.4.6 Predicted Sign

Based from the literature review, underpinning theory, hypotheses development and theoretical framework developed, this study concludes a prediction of positive sign to all independent variables and control variables towards dependent variable used in this study. Table 4.6 show details of predicted sign of independent and control variables with dependent variable for model 1, model 2 and model 3 respectively.

Table 4.6
*Predicted sign of Independent and Control Variables with Dependent Variable for Model 1, Model 2 and Model 3*

| **Model 1** | **Predicted sign with workplace innovation** | **Model 2** | **Predicted sign with organization innovation** | **Model 3** | **Predicted sign with Social capital** |
|---|---|---|---|---|---|
| Socialization | Positive (+ve) | Socialization | Positive (+ve) | Socialization | Positive (+ve) |
| Externalization | Positive (+ve) | Externalization | Positive (+ve) | Externalization | Positive (+ve) |
| Combination | Positive (+ve) | Combination | Positive (+ve) | Combination | Positive (+ve) |
| Internalization | Positive (+ve) | Internalization | Positive (+ve) | Internalization | Positive (+ve) |
| Communication | Positive (+ve) | Communication | Positive (+ve) | Communication | Positive (+ve) |
| Transformation | Positive (+ve) | Transformation | Positive (+ve) | Transformation | Positive (+ve) |
| Exploration | Positive (+ve) | Exploration | Positive (+ve) | Exploration | Positive (+ve) |
| Exploitation | Positive (+ve) | Exploitation | Positive (+ve) | Exploitation | Positive (+ve) |
| Leadership | Positive (+ve) | Leadership | Positive (+ve) | Trust | Positive (+ve) |
| Organization structure | Positive (+ve) | Organization structure | Positive (+ve) | Social ties | Positive (+ve) |
| Human resource management | Positive (+ve) | Human resource management | Positive (+ve) | | |

## 4.5 Semi-Structured Interview Protocol

Semi-structured interview protocol is used to answer the two research questions and objectives in this study namely: To explore the level of understanding of association between strategic knowledge management processes and social innovation among actors within Malaysian university-industry-community partnership ecosystem and; To identify actor's roles and key factors that can potentially impedes the process of knowledge application within Malaysian university-industry-community partnership ecosystem in achieving social innovation. The qualitative approach is used to support and add value to the main findings of quantitative method. Qualitative approach generated data from interview sessions with the aims to collect rich and holistic information within a research area towards answering the research objective of 'to explore' (Yin, 2003; Miller, 2012). Semi structured interview is an adaptable technique which allows question structure and sequence to be varied to suit the respondent (Saunders et.al., 2007). This allows the researcher to probe specific themes, taking into account each respondent's particular understanding, knowledge and experience (Jordan & Gibson, 2004).

The semi-structured interview protocol will be conducted during face to face interview sessions with the participants. The participants of semi-structured interview protocol sessions consist of I) Four (4) Project leader (university actors), II) Four (4) CEO/ Owner/ member of company (industry actors) and III) Four (4) Community member (community actors) from the Malaysian university-industry-community projects within the research university (RU) namely; 1) RU 1, 2) RU 2, 3) RU 3, 4) RU 4, 5) RU 5 with their respective industries and communities partners. Therefore, for semi-structured interview protocol a total number of 12 respondents will be participating comprises of 12 interview sessions. Table 4.7 show the questions of semi-structured interview protocol for answering the research questions and research objectives of no. 4 and no.5 respectively.

Table 4.7

*Questions of Semi-Structured Interview Protocol*

| Questions no. | Question items | Research question/objective |
|---|---|---|
| 1. | ➢ Could you tell me a bit about yourself i.e. background and experience? | To explore the level of understanding of association between strategic knowledge management processes and social innovation among actors within Malaysian university-industry-community partnership ecosystem. |
| 2. | ➢ Why do you interested to get involved in this partnership project? | |
| 3. | ➢ Based on your knowledge, can you briefly explain about strategic knowledge management processes? | |
| 4. | ➢ What contribution do you think that this strategic knowledge management partnership project contributes to? | |
| 5. | ➢ Based on your involvement with this partnership project, what are the benefits that you and other partners gained? | |
| 6. | ➢ Do you agree that this strategic knowledge management partnership project developed new innovation into products, processes and services? If yes, what is this new innovation leads to achieve? | |
| 7. | ➢ Can you explain briefly on your responsibility in this partnership project? | To identify actor's roles and key factors that can potentially impedes the process of knowledge application within Malaysian university-industry-community partnership ecosystem in achieving social innovation. |
| 8. | ➢ Do you think that you get involved in every processes of strategic knowledge management within this partnership project? | |
| 9. | ➢ Have you ever been involved in commercializing the partnership project outcome i.e. products, processes and services? | |
| 10. | ➢ What is this commercializing process leads to achieve? | |
| 11. | ➢ Overall what have been your main challenges with regards to commercializing activities? | |
| 12. | ➢ In your opinion, what are the improvements or any added value that must be undertaken in order to make sure that the commercialization activities can be fully achieved in regards to the new highly innovative products, processes or services created within your partnership project? | |

## 4.6 Data Analysis Method

The study will analyse quantitative data by using SPSS software version 19. The analysis comprises of data screening procedures which involves detection of missing data, outliers and non-response bias. Furthermore, this study analyse descriptive analysis, reliability and validity analysis, t-test analysis, assumption of multiple regression which involves normality test, linearity test, homoscedasticity test, multi-collinearity test and followed by correlation analysis and hypothesis testing. For hypotheses testing, multiple regressions analysis was applied. Descriptive statistics highlighted respondent's demographic profile used in the early section of questionnaire. Correlation and multiple regressions analysis are used to measure strength of relationship between related variables i.e. Dependent variable, independent variables and Control variables. For qualitative approach in supporting the main finding of quantitative method, the information gathered from semi-structured interview protocol sessions with participants will be transcribe, coded and categorised according to the theme. This study will also consider a hybrid approach which refers to the combination of using NVivo 11 software and manual analysis in order to analyse the information given and to suit the theme and to construe a meaningful insights based on participant's subjective perception, interpretation and experiences (Sarantakos, 2005).

Related documentations, statistical records and files of Malaysian university-industry-community partnership will also be examining in giving support to the above findings, specifically on the quantitative method. According to Yin (2003), documentations can be a source of rich information for example to gain general information on Malaysian university-industry-community partnership policy, actors profiles, partnership activities, performance achievements to date and other general issues related to the study under analysis.

## 4.7 Pilot Study

This section presents a summary of the pilot study conducted for quantitative and qualitative method of analysis in this study. The main aim of the pilot study in the quantitative method is to ensure the reliability and validity of the instruments used in this study. According to Sekaran (2003), a pretest of the instruments is important in ensuring the instruments is reliable and valid and understood by the respondents and thus, the wording and measurements used are well accepted. According to Sekaran, (2000), pilot study addressed the aspect of wording, reliability and validity of the instrument items used before undertaking actual data collection of the study. Furthermore, the pilot study in the quantitative method of analysis is important in order to make used the researcher with the fieldwork and to foresee the obstacles and to identify any corrective actions that must be done in regards to the research instruments used in this study (Creswell & Clark, 2007).

Within the qualitative method of analysis, the aim of conducting pilot study is concerned with the terms rigorious, trustworthiness and validation procedures of interview instruments (Rolfe, 2006). According to Lietz et.al., (2006), rigorious and trustworthiness is refers to the interview instruments that are fulfills the criteria of credibility, transferability and dependability in which to ensure the neatness of qualitative analysis findings. Furthermore, validation procedure or confirmability in the qualitative methods of analysis is also undertaken in order to ensure that the main theme identify and discuss in the qualitative findings is highly credible (Creswell & Miller, 2000; Morse et.al., 2002; Kim, 2011). To eloborate further, the inital data transcription gathers from the semi-structured interview protocol sessions must undergo a systematic process and scrutinized by an expert which involves reviewing and conforming the initial interview transcripts, data coding analysis and categorisation of main themes and therefore, reduce the element of bias and to have a highly credible qualitative findings (Golafshani, 2003; Kim, 2011).

### 4.7.1 Pilot Study: Quantitative Method of Analysis

Reliability and validity test were conducted for the purpose of pilot study within quantitative method of this study. Reliability test is to ensure internal consistency of measurements of the items used and validity tests were conducted to ensure the measurement scales were accurately measured (Sekaran & Bougie, 2011). From the above statements, for reliability test, Zikmund, (2000) and Sekaran (2006) highlighted for the purpose of pilot study in the quantitative method, a minimum number of 30 to 50 of the sample size is adequate and reasonable to consider enrolling reliability test in the pilot study. Hence, this study used the sample size of 50 in order to undertake the reliability test for the purpose of pilot study.

#### 4.7.1.1 Reliability Analysis

The reliability of a measure indicates the extent to which it is without bias (error free) and, hence ensures consistent measurement across time and across the various items in the instrument (Sekaran & Bougie, 2011). In other words, the reliability of a measure is an indication of the stability and consistency in which the instrument measures the concept and helps to assess the goodness of a measure (Sekaran & Bougie, 2011). Cronbach's alpha value is commonly used as the statistical indicator of reliability analysis. Nunnaly and Bernstein (1994) suggested that Cronbach's alpha must be greater than 0.6 or 60% for the instruments to be deemed acceptable. However, according to Hair et. al., (2010) suggested that the rule of thumb for acceptance level of Cronbach's alpha value must be higher than 0.70. The cut-off point for measuring the reliability for this study is coefficient alpha of above 0.70 as recommended by Hair et. al., (2010). Table 4.8 exhibits the Cronbach coefficient alpha value of the variables collected from the 50 respondents represents by the project leader i.e. academic actors; of Malaysian university-industry-community partnership projects. All the variables in this study have the Cronbach's alpha values of more than 0.70.

Table 4.8:
*Reliability Coefficients for Variables*

| Construct/Dimension | N of Item | Cronbach's Alpha |
|---|---|---|
| Social Innovation | **17** | **0.765** |
| *Workplace Innovation* | 6 | 0.711 |
| *Organization Innovation* | 6 | 0.710 |
| *Social Capital* | 5 | 0.708 |
| Strategic Knowledge Management | **37** | **0.857** |
| Knowledge Creation | 16 | 0.770 |
| *Socialization* | 4 | 0.758 |
| *Externalization* | 4 | 0.783 |
| *Combination* | 4 | 0.758 |
| *Internalization* | 4 | 0.782 |
| Knowledge Transfer | 10 | 0.736 |
| *Communication* | *5* | *0.788* |
| *Transformation* | *5* | *0.711* |
| Knowledge Application | 11 | 0.726 |
| *Exploration* | *5* | *0.798* |
| *Exploitation* | *6* | *0.754* |
| Control Variables | **24** | |
| Leadership | 5 | 0.735 |
| Organization Structure | 5 | 0.786 |
| Human Resource Management | 5 | 0.770 |
| Trust | 5 | 0.744 |
| Social Ties | 4 | 0.746 |

As revealed in Table 4.8 above, coefficient alphas for all study variables were above the acceptable level of 0.70 (Cavana et. al., 2001; Hair et.al., 2010) ranging from a minimum of 0.710 to 0.857. Accordingly, no items were deleted from the present scales. All the variables in this study have values above 0.70. Overall, the analysis indicated that each instrument was meaningfully measured and represented by reliable items. The above Cronbach's alpha value shows that the index had high reliability. The data were collected from May 2016 to October 2016. These questionnaires were delivered to 50 project leaders i.e. academic actors, in the Malaysian university-industry-community partnership projects through personal administered and internet mail approach. In order to measure the relationship of strategic knowledge management processes i.e. knowledge creation, knowledge transfer and knowledge application; with social innovation within the context of Malaysian university-industry-community partnership ecosystem, 78 questions were used to measure respondents perspective in all variables: Social innovation i.e. dependent variable, comprises of 17 questions, represent by the dimension of workplace

innovation 6 items, organization innovation 6 items and social capital 5 items by using 5 point likert-scale, ranked from 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree and 5 = strongly agree. Knowledge creation, knowledge transfer and knowledge application represent independent variable, comprises of 37 questions in total, comprises of 16 items for the dimension of knowledge creation, 10 items measuring the dimension of knowledge transfer and 11 items used to measure knowledge application. 5 point likert-scale had been ranked from 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree and 5 = strongly agree. Control variables comprises of 24 items where 5 items developed to measure leadership, 5 items measuring organization structure, 5 items for human resource management, 5 items for trust and 4 items measuring social ties, in a 5 point likert-scale ranging from 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree and 5 = strongly agree.

#### 4.7.1.2 Validity Analysis

The two validity tests used were content or face validity and construct validity (Zikmund, 2003). Content or face validity is concerned with the degree that the scale items represent the domain of the concept under study (Hardesty & Bearden, 2004) and it involves a systematic and subjective assessment (Hair et. al., 2007). This test was carried out during the pre-test stage where the measurement scales were reviewed by two academic quantitative experts, whom is a research specialist in the area of quantitative method of analysis within the area of accounting and management. The reason this was done was to solicit feedback if any revision or modification is needed to the scale. Minor modification were made on the variable scale items. Upon receipt of the feedback, changes were made accordingly. Furthermore, construct validity deals with the degree to which the construct or scale represents and acts like the concept being measured (Bagozzi et.al., 1991). The construct validity was assessed from both the theoretical and statistical

perspective. The instruments for the variables in this study were established from previous studies that supported the theoretical construct validity.

The principal technique that was performed on all the constructs to support the statistical construct validity was to examine the Varimax rotation Principal Components Analysis (PCA). Tabachnick and Fidell (2001) fully supported the PCA for the factor extraction over the Explanatory Factor Analysis (EFA) especially for empirical summary of data set. All the factors for variables in this study were considered as multi-dimensional. The purpose is to validate the scales and to determine the factor loading. All the independent and dependent variables were submitted to PCA to determine their factor loading. As a rule of thumb, Tabachnick and Fidell, (2001) suggested that only a variable with a loading of 0.32 and above should be considered. Nevertheless, Comrey and Lee (1992) interpreted that any loading that exceeds 0.71 is considered excellent, 0.63 as very good, 0.55 as good, 0.45 as fair, and 0.32 as poor. However, Tabachnick and Fidell (2001) indicated that the cut off point for size of loading is a matter of researcher's preference. For this study, based on the size of loadings which were influenced by homogeneity of scores in the samples, a factor loading which is higher than 0.40 will be considered.

Tabachnick and Fidell (2001) have indicated that in order to conduct factor analysis, a total number of more than 150 samples would be ideal. For this study a usable sample size of 218 were employed. Another consideration for factor analysis as suggested by Tabachnick and Fidell (2001) is Maiser-Meyer-Olkin (KMO) statistic should be a minimum of 0.6 (Kaiser, 1970). If this value falls below the minimum value, it is recommended that either more date be collected or that other variables should be included (Field, 2009). Hutcheson and Sofroniou (1999) interpreted the KMO values at being between 0.5 and 0.7 as mediocre, 0.7 and 0.8 as good, values between 0.8 and 0.9

are great and value above 0.9 as superb. The outcomes of the factor analysis of all the variables shown in the table 4.7 to table 4.10 below:

#### 4.7.1.2.1 Social Innovation

The measurement scales for social innovation consisted of 17-items. The Varimax rotated principal components factor analysis was conducted. Prior to performing the principal components analysis (PCA), the suitability of the data for factor analysis was assessed. Correlation matrix indicated item coefficients were 0.3 and above. There were a total of two statistical measures to assess the factorability of the data conducted through 1) Kaiser-Meyer-Olkin (KMO) to determine the measure of sampling adequacy value. The value reported was 0.877, exceeding the recommended value of 0.6 (Kaiser, 1970); 2) Barlett's test of sphericity (Barlett, 1954) is significant at $p<0.001$. Since the KMO value is reported as 0.877, it is interpreted as in the range of great (Hutcheson & Sofroniou, 1999). Therefore the sample size here is adequate for factor analysis. The total variance explained is reported as 71.90 percent. Only factors with a loading value of 0.40 and above were considered. One item was deleted prior to anti-image analysis (a2-Project actors frequently work through partnership forum and team work). Factor loading accepted all three factors based on the original items. Table 4.9 shows the factor loading value for this scale. It ranges from 0.405 to 0.883.

Table 4.9:
*Factor Analysis for Social Innovation*

| Factor/Items | Factor Loading | | |
|---|---|---|---|
| | 1 | 2 | 3 |
| **Factor 1: Social Capital** | | | |
| a13- All actors in the project shared the same belief, motives and goals towards the success of the project. | .827 | | |
| a14 All actors in the project are highly trusted and have a high sense of trustworthiness in sharing knowledge. | .831 | | |
| a15- All actors in the project have close social relationship (example: recreational activities, informal gathering) with each other . | .883 | | |
| a16- All actors frequently shared any knowledge and information regarding project matters with each other to improve skills and capabilities. | .774 | | |
| a17- New solution that can be embedded into products, processes and services is created from shared resources of project relationships. | .588 | | |
| **Factor 2:Organization Innovation** | | | |
| a7- The project management team allows decentralised decision making and flexible job responsibilities. | | .594 | |
| a8- The project management team constantly encourage actors social relationship as a medium to enhance social value and propensity to innovate towards project objectives. | | .662 | |

Table 4.9 (Continued)

| Factor/Items | Factor Loading | | |
|---|---|---|---|
| | 1 | 2 | 3 |
| a9- The project management team imolement best practises and provide convenient environment throughout project duration to enhance actors motivation, performance and participation. | | .821 | |
| a10- The project management team constantly emphasizes on actors integration between each other and working as a unit throughout project duration. | | .828 | |
| a11- The project management team often restructure to adapt to changes during the project duration. | | .830 | |
| a12- The project management team often implement new administrative system to make the project more efficient and effective throughout the duration of the project. | | .814 | |
| **Factor 3: Workplace Innovation** | | | |
| a1- Project management team allows work autonomy, empowerment and flexible working schedule. | | | .405 |
| ~~a2- Project actors frequently work through partnership forum and team work~~. | | | |
| a3- Project management team constantly updating project process and allow job rotation among actors. | | | .788 |
| a4- Project management team concern on the welfare and social security of the actors. | | | .831 |
| a5- Project leader provide individual support in enhancing actors human resource value through training, sharing knowledge and stimulate learning culture among actors. | | | .822 |
| a6- The project outcome creates new solution,techniques and methods towards improving products, processes and services. | | | .628 |
| Eigenvalues | 7.822 | 1.810 | 1.552 |
| Percentage | 48.888 | 13.312 | 9.702 |
| KMO | 0.877 | | |
| Barlett's test of sphericity | 2549.008 | | |
| Sig. | 0.000 | | |

#### 4.7.1.2.2 Knowledge Creation

The measurement scales for knowledge creation consisted of 16-items. The Varimax rotated principal components factor analysis was conducted. Prior to performing the principal components analysis (PCA), the suitability of the data for factor analysis was assessed. Correlation matrix indicated item coefficients were 0.3 and above. There were a total of two statistical measures to assess the factorability of the data conducted through: i) Kaiser-Meyer-Olkin (KMO) to determine the measure of sampling adequacy value. The value reported was 0.870, exceeding the recommended value of 0.6 (Kaiser, 1970); ii) Barlett's test of sphericity (Barlett, 1954) is significant at $p<0.001$. Since the KMO value is reported as 0.870, it is interpreted as in the range of great (Hutcheson & Sofroniou, 1999). Therefore the sample size here is adequate for factor analysis. The total variance explained is reported as 51.38 %. Only factors with a loading value of 0.40 and above were considered. Two items were deleted due to low anti-image correlation matrix (b31- The project always engages with practical activities such as learning by doing, experimenting, training and simulation and b33- Practical activities enhance all project actors tacit and personal knowledge). Factor loading accepted all four factors based on the original items. Table 4.10 below shows the factor loading value for this scale. It ranges from 0.470 to 0.849.

Table 4.10:
*Factor Analysis for Knowledge Creation*

| **Dimension/Factor** | **Factor Loading** | | | |
|---|---|---|---|---|
| | **1** | **2** | **3** | **4** |
| **Factor 1: Combination** | | | | |
| b26- All project actors know very well about their roles and responsibilities and have a positive attitude towards ICT. | .673 | | | |
| b27- The project management team equip actors with good ICT facilities and allow actors to access other related facilities | .493 | | | |

Table 4.10 (Continued)

| Dimension/Factor | Factor Loading | | | |
|---|---|---|---|---|
| | 1 | 2 | 3 | 4 |
| b28- All project actors are ICT literate in order to reconfigure, diffuse and systemize new knowledge. | .616 | | | |
| b29- All project actors frequently used ICT facilities in order to communicate and disseminate new knowledge to other actors. | .649 | | | |
| **Factor 3: Internalization** | | | | |
| b30- Project explicit knowledge is written in comprehensive and well-structured documents | | .576 | | |
| ~~b31- The project always engages with practical activities such as learning by doing, experimenting, training and simulation.~~ | | | | |
| b32- Project leader always tolerates failures and continuously encourage trial and error. | | .529 | | |
| ~~b33- Practical activities enhance all project actors tacit and personal knowledge.~~ | | | | |
| **Factor 3: Externalization** | | | | |
| b22- All project actors participate in open dialogue and community of practice with each other to structure and record knowledge | | | .470 | |
| b23- All project actors have a high sense of trust, high degree of communication, social closeness and shared values. | | | .526 | |
| b24- The project leader/ project management team listens to all opinions and recommendations from every project actors. | | | .714 | |
| b25- All project actors keep new knowledge in documentations i.e. database, intranet files and other computer software that are easy to understand and shared. | | | .560 | |
| **Factor 4: Socialization** | | | | |
| b18- All project actors spent a lot of time interacting through informal meeting and social activities in order to discuss and exchange ideas, experience and opinions | | | | .752 |
| b19- The project management team allows sharing experience, observation, imitation and mentoring activities | | | | .543 |

Table 4.10 (Continued)

| Dimension/Factor | Factor Loading | | | |
|---|---|---|---|---|
| | 1 | 2 | 3 | 4 |
| b20- Project leader always encourage, motivate and guiding other actors to have a formal and informal joint activities i.e. open dialogue, spending time together. | | | | .802 |
| b21- The environment within the project take place in a high level of trust, interpersonal relationship, openness and low level of cultural and language differences | | | | .849 |
| Eigenvalues | 3.212 | 1.276 | 1.143 | 1.047 |
| Percentage | 24.709 | 9.814 | 8.796 | 8.057 |
| KMO | 0.870 | | | |
| Barlett's test of sphericity | 391.905 | | | |
| Sig. | 0.000 | | | |

#### 4.7.1.2.3 Knowledge Transfer

The measurement scales for strategic knowledge consisted of 16-items. The Varimax rotated principal components factor analysis was conducted. Prior to performing the principal components analysis (PCA), the suitability of the data for factor analysis was assessed. Correlation matrix indicated item coefficients were 0.3 and above. There were a total of two statistical measures to assess the factorability of the data conducted through i) Kaiser-Meyer-Olkin (KMO) to determine the "measure of sampling adequacy" value. The value reported was 0.825, exceeding the recommended value of 0.6 (Kaiser, 1970); ii) Barlett's test of sphericity (Barlett, 1954) is significant at $p<0.001$. Since the KMO value is reported as 0.825, it is interpreted as in the range of great (Hutcheson & Sofroniou, 1999). Therefore the sample size here is adequate for factor analysis. The total variance explained is reported as 53.35%. Only factors with a loading value of 0.40 and above were considered. Two items were deleted due to low anti-image correlation matrix (b34- All project actors frequently communicate new knowledge with each other through verbal and non-verbal approach and b36- All project actors can communicate with each other effectively and efficiently). Factor loading accepted all four factors based on the original items. Table 4.11 below shows the factor loading value for this scale. It ranges from 0.527 to 0.859.

Table 4.11:
*Factor Analysis for Knowledge Transfer*

| Dimension/Factor | Factor Loading | |
|---|---|---|
| | 1 | 2 |
| **Factor 1: Communication** | | |
| ~~b34- All project actors frequently communicate new knowledge with each other through verbal and non-verbal approach.~~ | | |
| b35- All project actors regularly donating and collecting new knowledge with each other. | .577 | |
| ~~b36- All project actors can communicate with each other effectively and efficiently.~~ | | |
| b37- All project actors can express new knowledge and ideas clearly | .845 | |
| b38- Project leader always play a leading role in established a constructive communication climater throughout project duration. | .859 | |
| **Factor 2: Transformation** | | |
| b39- All project actors have the ability to transform new knowledge into practical work. | | .705 |
| b40- All project actors record and store new knowledge for future reference. | | .608 |
| b41- All project actors are capable to absorb new knowledge and prepare it for further purposes and to make it available. | | .527 |
| b42- All project actors aware of their competencies to eliminate obsolete old knowledge and replace it with newly acquired knowledge for new innovation. | | .732 |
| b43- All project actors regularly meet to discuss on the progress of transformation and utilisation of new knowledge towards products, processes and services development. | | .669 |
| Eigenvalues | 3.130 | 1.138 |
| Percentage | 39.126 | 14.226 |
| KMO | 0.825 | |
| Barlett's test of sphericity | 409.536 | |
| Sig. | 0.000 | |

#### 4.7.1.2.4 Knowledge Application

The measurement scales for knowledge application consisted of 11-items. The Varimax rotated principal components factor analysis was conducted. Prior to performing the principal components analysis (PCA), the suitability of the data for factor analysis was assessed. Correlation matrix indicated item coefficients were 0.3 and above. There were a total of two statistical measures to assess the factorability of the data conducted through i) Kaiser-Meyer-Olkin (KMO) to determine the measure of sampling adequacy value. The value reported was 0.833, exceeding the recommended value of 0.6 (Kaiser, 1970); ii) Barlett's test of sphericity (Barlett, 1954) is significant at $p<0.001$. Since the KMO value is reported as 0.833, it is interpreted as in the range of great (Hutcheson & Sofroniou, 1999). Therefore the sample size here is adequate for factor analysis. The total variance explained is reported as 47.18 %. Only factors with a loading value of 0.40 and above were considered. Two items were deleted due to low anti-image correlation matrix (b53- All project actors are capable in sharing new knowledge to improve and refine existing products, processes and services and b54- It is clearly known among actors how activities within the project should be performed). Factor loading accepted all four factors based on the original items. Table 4.12 below shows the factor loading value for this scale. It ranges from 0.511 to 0.824.

Table 4.12:
*Factor Analysis for Knowledge Application*

| **Dimension/Factor** | **Factor Loading** | |
|---|---|---|
| | **1** | **2** |
| **Factor 1: Exploration** | | |
| b44- The project invents and introduces new products, processes and services that are completely new. | .545 | |
| b45- The project leader regularly organised special meeting with other actors to acquire new knowledge. | .638 | |
| b46- All project actors accept instruction that go beyond existing policy and procedures to develop new products, processes and services. | .636 | |

Table 4.12 (Continued)

| Dimension/Factor | Factor Loading | |
|---|---|---|
| | 1 | 2 |
| b47- The project management team throughly observed technological trends and public demands throughout project duration. | .511 | |
| b48- Project actors frequently utilised new knowledge oportunity throughout project duration. | .731 | |
| **Factor 2: Exploitation** | | |
| b49- The project frequently implements adaption of new knowledge towards existing products, processes and services. | | .824 |
| b50- The project improves exsiting products, processes and services within the project. | | .752 |
| b51- Project leader regularly review the developement of products, processes and services to exploit of new knowledge. | | .570 |
| b52- All project actors are capable of recognising the usefulness of new knowledge to combine with existing knowledge within the project. | | .689 |
| ~~b53- All project actors are capable in sharing new knowledge to improve and refine existing products, processes and services.~~ | | |
| ~~b54- It is clearly known among actors how activities within the project should be performed.~~ | | |
| Eigenvalues | 3.018 | 1.229 |
| Percentage | 33.531 | 13.652 |
| KMO | 0.833 | |
| Barlett's test of sphericity | 364.839 | |
| Sig. | 0.000 | |



### 4.7.2 Pilot Study: Qualitative Method of Analysis-Rigorousness, Trustworthiness and Validation Procedures

Two preliminary interview sessions were conducted in order to fulfil the requirement of the rigorousness, trustworthiness and validation procedures before the main interview sessions is undertaken for this study. According to Miller (2012), within the pilot study of qualitative method of analysis, there is no consensus as to how many interview sessions are adequate. This statement is supported by Patton (2001), Yin (2003) and Creswell (2015) by highlighting that the qualitative instruments that undergo the procedures of rigorousness, trustworthiness and validation before the actual interview sessions is conducted is said to use the right measures for the objectives being

studied, to have a consistency within the findings of the qualitative research and to fulfils the requirement of an expert verification of qualitative findings in order to avoid bias and to have a high credibility finding of qualitative enquiry. Thus, two interview sessions conducted for the purpose of qualitative pilot study analysis is justified.

Within the pilot study of qualitative method of analysis, two interview sessions were conducted with the three main actors of Malaysian university-industry-community partnership projects namely, academician, industry and community actor. Specifically, the two interview sessions consist of one interview session from the university-industry partnership project of RU 1 and another interview session is from university-community partnership project of RU 1. Interviewees were asked semi-structured interview protocol questions on various issues which emerged out of the literature in relation to explore the level of understanding of association between strategic knowledge management processes and social innovation among actors within Malaysian university-industry-community partnership ecosystem and to identify actor's roles and key factors that can potentially impedes the process of knowledge application within Malaysian university-industry-community partnership ecosystem in achieving social innovation. The findings of two pilot study interviews were presented in the later section.

#### 4.7.2.1 Rigorous, Trustworthiness and Validation Procedures

Under rigorousness and trustworthiness procedures, the elements of credibility, transferability and dependability must be fulfils. This can be achieved through undertaking procedures for example to seek objective opinions from experts and peer-reviewed regarding on as to how interviews questions could be made easier to understand, to avoid bias, free from leading and direct questions and also to avoid any potential ambiguity (Lincoln & Guba, 2000). To elaborate further, Shenton (2004) and Lincoln and Guba (2007) specifically describe credibility as the level of accuracy of

instruments used that will give an accurate measurement for answering qualitative research objective developed in this study. Moreover, transferability is concerned with the instruments used can be applied or generalised beyond the research under study (Yin, 2003). In addition, dependability is concerned with the consistency of the instruments used, whereby Yin (2003) explained the instruments can be used by other researcher within the same research environment and should arrive at the same findings and conclusions.

Creswell (1998) and Morrow (2005), highlighted validation procedures can be done through independent reviews, thorough scrutinised and validation process of interview instruments, initial interview transcripts, data coding analysis and categorisation of main themes by a qualitative expert or experience qualitative researcher. This statement is supported by Patton (2001), Silverman (2006) and Saunders et.al., (2007) by stressing validation procedures within the qualitative method of inquiry are the factors in which any qualitative researcher should be concerned in regards to the interpretation of the initial interview transcripts, analysis of the open codes and main themes and the quality of the findings. Validation procedures is concerned with the extent to which how far the initial interview transcripts, data coding analysis and categorisation of main themes are the result of the experiences and ideas of the interviewees rather than based on the description and preference of the researcher. However, some qualitative researchers among others Burnard et.al., (2008), Sinkovics and Ghauri (2008) and Elo et.al., (2014) argued that for qualitative method of inquiry it is not necessarily to conduct validation procedures as this may leads to a complicated issues of conformation of qualitative data analysis. Furthermore, Sinkovics and Ghauri (2008) stressed that unlike research in quantitative method of analysis, the procedures of validation is somewhat blurred within the qualitative literature, and are not applicable within the context of qualitative method of inquiry. This study used the findings of qualitative method of inquiry as only to support the main findings of quantitative method of

analysis and thus, this study follows the main if not all procedures of qualitative method of inquiry. Therefore, this study adopts the rigorous, trustworthiness and validation procedures. From the above paragraphs, table 4.13 shows the evaluation of rigorous and trustworthiness procedure while table 4.14 shows the validation procedure which was undertaken within the pilot study of qualitative method of inquiry of this study.

Table 4.13

*Rigorousness and Trustworthiness Procedure*

Objective qualitative 4: To explore the level of understanding of association between strategic knowledge management processes and social innovation among actors within the Malaysian university-industry-community partnership ecosystem

| | | Experts evaluation (Expert 1 and Expert 2) | |
|---|---|---|---|
| **Code item** | **Item** | **Rigorousness checklist** | **Trustworthiness checklist** |
| O4Q1 | Could you tell me a bit about yourself i.e. background and experience? | • Item developed is the right measurement to measure research objective/ question<br>• Item developed is accurate i.e. free from error<br>• Item developed is adequate to measure research question/ objective<br>• Item developed is congruence with the meaning of research question/ objective | • Item developed is easy to understand<br>• Item developed is consistent with research question/ objective<br>• Item developed is free from biased and ambiguity<br>• Item developed can be generalised in different settings |
| O4Q2 | Why do you interested to get involved in this partnership project? | | |
| O4Q3 | Based on your knowledge, can you briefly explain about strategic knowledge management processes? | | |
| O4Q4 | What contribution do you think that this strategic knowledge management partnership project contributes to? | | |
| O4Q5 | Based on your involvement within this partnership project, what are the benefits that you and other partners gained? | | |
| O4Q6 | Do you agree that this strategic knowledge management partnership project developed new innovation into the products, processes and services? If yes, what is this new innovation leads to achieve? | | |

Table 4.13 (Continued)

Objective qualitative 5: To identify actor's roles and key factors that can potentially impedes the process of knowledge application within Malaysian university-industry-community partnership ecosystem in achieving social innovation.

| Code item | Item | Experts evaluation (Expert 1 and Expert 2) | |
|---|---|---|---|
| | | **Rigorousness checklist** | **Trustworthiness checklist** |
| O5Q7 | Can you explain briefly on your responsibility in this partnership project? | • Item developed is the right measurement to measure research objective/ question<br>• Item developed is accurate i.e. free from error<br>• Item developed is adequate to measure research question/ objective<br>• Item developed is congruence with the meaning of research question/ objective | • Item developed is easy to understand<br>• Item developed is consistent with research question/ objective<br>• Item developed is free from biased and ambiguity<br>• Item developed can be generalised in different settings |
| O5Q8 | Do you think that you get involved in every processes of strategic knowledge management within this partnership project? | | |
| O5Q9 | Have you ever been involved in commercializing the partnership project outcome i.e. products, processes and services? | | |
| O5Q10 | What is this commercializing process leads to achieve? | | |
| O5Q11 | Overall what have been your main challenges with regards to commercializing activities? | | |
| O5Q12 | In your opinion, what are the improvements or any added value that must be undertaken in order to make sure that the commercialization activities can be fully achieved in regards to the new highly innovative products, processes or services created within your partnership project? | | |

Based on table 4.13 above, the evaluation of rigorous and trustworthiness procedure is undertaken before the pilot study and actual interview sessions taken place. Two experts of experienced academic qualitative researcher independently reviewing and scrutinised the twelve (12) questions in accordance with the items checklist provided in the rigorousness and trustworthiness procedure. This procedure may help to guard the question items against the aforementioned checklist above. Specifically, for rigorousness procedure, both experts had agree that all question items used in order to answer the two qualitative questions and objectives in this study is adequate, accurate and congruent and therefore, it is credible in measuring the research objectives and questions. Moreover, for trustworthiness procedure, the two experts also generally agree that all question items is consistent, easy to understand, free from bias and error and can be used by other researchers within the same research environment and should arrive at the same findings and conclusions. The finding of rigorous and trustworthiness procedure undertaken in this study is fulfilling the main requirement of "validity" and "reliability" process discussed by the earlier scholar of qualitative method among others by, Creswell (1998), Lincoln and Guba (2000), Patton (2001) and Yin (2003). Table 4.14 below shows the validation procedure of qualitative method of this study.

Table 4.14

*Validation Procedure*

Objective qualitative 4: To explore the level of understanding of association between strategic knowledge management processes and social innovation among actors within the Malaysian university-industry-community partnership ecosystem.

| No. | Code item | Question items | Initial interview transcription | Operational data definition/ assumptions | Open codes | Theme |
|---|---|---|---|---|---|---|
| 1. | O4Q1 | Could you tell me a bit about yourself i.e. background and experience? | (AA1*) -I possess a Ph.D., designated as a senior lecturer and I have 15 years of experience in my area of expertise. With my qualification, vast experience and networks that i have, can be impart and share with other partners. I do belief that it can benefits all partners in terms of enhance knowledge, skills and competency.<br>IA1*) -I possess a degree that related with my business area. I am the owner of my business. I have 20 years of experience in doing business. With my business experience, it helps to commercialise the product.<br>(CA1*) - I possess Diploma in teaching. I am the<br>Community leader in my area. I have 10 years of experience in doing community services and voluntary works in my related expertise. As a community leader, i empowered other community members to participate socially in this partnership project. | Academic actor possesses a higher academic qualification as compared to the industry and community actor. Academic actors view this partnership project as a platform that can benefits all partners. | (1) Education level,<br>(2) Experience level,<br>3) Networks<br>4) Continuous learning motivation and intellectual abilities | Prior knowledge |

Table 4.14 (Continued)

| No. | Code item | Question items | Initial interview transcription | Operational data definition/ assumptions | Open codes | Theme |
|---|---|---|---|---|---|---|
| 2. | O4Q2 | Why do you interested to get involved in this partnership project? | (AA1*) –My objective is to create, transfer, and apply tacit and explicit knowledge resource that I have in my area of expertise with others. I want to help industry partner to developed new product and also upgrades and up scaling their current products. I want to help graduate intern to improve their knowledge, skills and know-how so that they can become a highly innovative worker or entrepreneur.<br>(IA1*) –I want to have the opportunity to create new highly innovative products in my business area. By having this, my business can sustain within the market, company profits will increase, and company can become more efficient and effective in terms of production and operation, can gain a substantial amount of market and can overcome the problems of market saturation and have a competitive advantage among our competitors.<br>(CA1*) –I participate in order to contribute myself towards helping to curb and preventing the unhealthy activities among youth in my area. | Academic actor has a comprehensive understanding with regards to the partnership project. Industry actor only interested in fulfilling their private motives and community actors see this partnership as social activity. | 5) Gain high quality teaching and world class research<br>6) Recognising the needs to improve social well-being and economic growth<br>7) Only for financial and private gain<br>8) Pure social purpose<br>9)Different organizational culture and setting<br>(10) Interest and opportunist | Knowledge resource outcome |

Table 4.14 (Continued)

| No. | Code item | Question items | Initial interview transcription | Operational data definition/ assumptions | Open codes | Theme |
|---|---|---|---|---|---|---|
| 3. | O4Q3 | Based on your knowledge, can you briefly explain about strategic knowledge management processes? | (AA1*) - It is about creating, transfer, sharing and implementing new knowledge resource between partners.<br>(IA1*) - It is about learning, transfer and implements new technology, so that I can have new products in the market.<br>(CA1*) - Academia teach and give instructions to us on how to deals with glue sniffing problem among youth in our area. | Academic actor can recognise all the actual process of strategic knowledge management as compared to industry and community actor. | 11) Recognising the actual processes of strategic knowledge management<br>(12) Recognising the actual outcome of strategic knowledge management processes | Knowledge resource process |
| 4. | O4Q4 | What contribution do you think that this strategic knowledge management partnership project contributes to? | AA1*) –We developed a new innovative product that has dermatological benefits and there is no such product within the market yet. This partnership improved and enhances knowledge resource, skills and know-how between partners in the related expertise<br>(IA1*) -We developed a new product with dermatological benefits. The partnership project also introducing a new product line to our production and business.<br>(CA1*) -I can see that this partnership creates new solution in terms of creating a special education module to combat social issue in hand. This partnership project bring together community from all walks of life to get involve and participate in the social activities and community out-reach programme and at the same time communicate with each other regarding the social problem in hand. | All actors i.e. academic, industry and community, confirm that the partnership developed new thing in terms of product, processes or services and all of them show high awareness regarding the outcome contribution of this partnership. | 13) New solution<br>14) New product, processes and services<br>(15) New innovation<br>(16) Human skills | Knowledge resource value |

Table 4.14 (Continued)

| No. | Code item | Question items | Initial interview transcription | Operational data definition/ assumptions | Open codes | Theme |
|---|---|---|---|---|---|---|
| 5. | O4Q5 | Based on your involvement within this partnership project, what are the benefits that you and other partners gained? | (AA1*) – I gained new knowledge resource in terms of industry knowledge.<br>(IA1*) – I gained new solution and valuable information on how to developed new product and established new product line within our company.<br>(CA1*) – I gained information on the issue of unhealthy social activities, in terms of the root cause of the problem occurs, the substance used in this particular case, the effects on individual health and steps to be taken in order to monitor and prevent this unhealthy activities. | All actors recognised that they had gained a diverse new knowledge resource. | 17) Practical knowledge of real life business operation and environment.<br>18) New scientific knowledge resource | Same as above |
| 6. | O4Q6 | Do you agree that this strategic knowledge management partnership project developed new innovation into the products, processes and services? If yes, what is this new innovation leads to achieve? | AA1*) - Yes, i definitely agree that this partnership achieve its objective by providing new innovation in terms of developing a new product. This new medical product leads to improves health condition among people.<br>(IA1*) -Yes. The new product has dermatological benefits to the person that consumed it. This as a result, gives a huge advantage to the company business in gaining a substantial amount of market share as compared to other competitors and enhances company sustainability. Furthermore, this product is one of its kinds in the market today.<br>(CA1*) - Yes, we do agree that this partnership developed a new innovation in terms of creating a special education module, which can be implemented by community members and other NGO's in order to overcome the social issue in our area. We share the knowledge and information to other community members in order to increase the awareness and understanding on the danger of this unhealthy social activity among youth. | All actors show different kind of understanding on the innovation outcome. Academic actor relates with social innovation, industry actor relates with technological innovation whereas community actor relates with corporate social responsibility | 19) Social innovation<br>20) Technological innovation<br>21) Corporate Social Responsibility | Recognising type of innovation outcome |

Table 4.14 (Continued)

*Objective qualitative 5: To identify actor's roles and key factors that can potentially impedes the process of knowledge application within Malaysian university-industry-community partnership ecosystem in achieving social innovation.*

| No. | Code item | Question items | Initial interview transcription | Operational data definition/ assumptions | Open codes | Theme |
|---|---|---|---|---|---|---|
| 7. | O5 Q7 | Can you explain briefly on your responsibility in this partnership project? | (AA1*) - I act as the leader and mediator with other partners. I am the main source and transferor of new knowledge resource to other partners.<br>(IA1*) – I received and implement the new knowledge resource creates within our project. I share my industry expertise and information with other partners.<br>(CA1*) – I am responsible to learn and received the information given by the university professors and also share my view on the community information with them. | Academic actor acts as the main source of new knowledge and assists other partner in the context of knowledge network. Industry actor act as the main implementer while community actor act as receiver and disseminator of new knowledge created. | (22) New knowledge producer<br>(23) New knowledge transferor | Roles |
| 8. | O5 Q8 | Do you think that you get involved in every processes of strategic knowledge management within this partnership project? | (AA1*) - Yes. I did get involved in every processes right from the formation of this partnership project until the application of new knowledge. Furthermore, i also involve in the commercialization of new product.<br>(IA1*) - Yes. We are all get involved in every processes right from the formation of this partnership project until the preliminary commercialization of new knowledge or scientific formula applied into the product.<br>(CA1*) - I get involved in part of the processes mainly in the knowledge transfer process. | Same as above | (24) New knowledge implementer<br>(25) Knowledge mediator | Same as above |

Table 4.14 (Continued)

| No. | Code item | Question items | Initial interview transcription | Operational data definition/ assumptions | Open codes | Theme |
|---|---|---|---|---|---|---|
| 9. | O5Q9 | Have you ever been involved in commercializing the partnership project outcome i.e. products, processes and services? | (AA1*) - Yes. Now i involved in the preliminary stage of commercializing the new product developed in the partnership project. I assist in product market survey, product specification and testing, quality control checking and also documents submission for product registration with the related relevant authorities.<br>(IA1*) - Yes. As the owner of the business, I act as the front-liner and lead other members when it comes to the commercialization activities. Commercialization process is involves entirely industrialised process for example the setting up cost for effective production, preparation of production and engineering process of factory and also documentations process which refers to the bureaucracy approval in regards with complying the requirements from various related authority in connection with products commercialization.<br>(CA1*) - No. I believed that as a community partner, we only done our part towards fulfil social purpose and responsibility for the community that we responsible to. | Academic and industry actor involves in knowledge application roles by performing duties that are related to the commercialization process. For community actor, knowledge application roles for them are to disseminate the new knowledge resource through informal group discussion, informal social meeting and gathering and other community out-reach programme to other community members. | (26) Facilitator for product commercialization process<br>(27) Consultant for compliance process of product commercialization<br>(28) New knowledge resource disseminator<br>(29) New knowledge receiver | Same as above |

Table 4.14 (Continued)

| No. | Code item | Question items | Initial interview transcription | Operational data definition/ assumptions | Open codes | Theme |
|---|---|---|---|---|---|---|
| 10. | O5Q10 | What is this commercializing process leads to achieve? | (AA1*) - The commercialization process can leads to the introduction of new dermatological product in the market which have huge medical benefits to users and communities at large in terms of improving their health quality and introduction of new product line to the industry partner.<br>(IA1*) - This commercialization process leads to achieve new commercialization of academia scientific knowledge and developed new dermatological product which in turn contributes to a financial profit and maintain control over market competitive advantage for our company.<br>(CA1*) - If the special education module of how to curb and prevent unhealthy social activities among youth can be commercialized, it can leads to producing a best practice and guidance module that can reached and benefits larger community members throughout nationwide on the particular issue. | All actors shows a conflicting interest of the outcome of knowledge application process | (30) Conflicting interest | Challenges |

Table 4.14 (Continued)

| No. | Code item | Question items | Initial interview transcription | Operational data definition/ assumptions | Open codes | Theme |
|---|---|---|---|---|---|---|
| 11. | O5Q11 | Overall what have been your main challenges with regards to commercializing activities? | (AA1*) - In my opinion, the preliminary requirements for commercializing the new products created within the partnership project are the main challenges with regards to the commercializing activities. The preliminary requirements that i referred to are the setting up cost for effective production, preparation of engineering processes of factory in commercializing the product, to get an approval in regards with complying the requirements from various related authority in connection with products commercialization.<br>To attract interest and to have a full commitment from the industry partner in relation to the partnership project. For example disclosure of existing business strategy and plan, business processes and other related matters. Furthermore, to convince them in terms of the relevancy and the benefits that they might gained when they become part of the partnership project without having stressed more on commercial and private benefits. | All actors confirms and explain about the key factors for example high bureaucracy practices, business disclosures issues, innovation requirements issues, understanding and commitment issues and also financial constraints issues must be taken into consideration for improvements and add value in the knowledge application process. | (31) The presence of high bureaucracy practises for product commercialization<br>(32) Business disclosures issues<br>(33) Innovation requirements issues<br>(34) Understanding and commitment issues<br>(35) Financial constraints issues. | Challenges |

Table 4.14 (Continued)

| No. | Code item | Question items | Initial interview transcription | Operational data definition/ assumptions | Open codes | Theme |
|---|---|---|---|---|---|---|
| 11. | O5Q11 | Same as above | (IA1*) - The difficulty of the supplier to supply with the accurate specifications of items ordered based on the scientific formula created within this partnership project in order to produce new highly innovative products. To elaborate further, we are facing regular problems for example items being supplied by the supplier contains manipulative ingredients which are not according to the new innovative specifications given to them i.e. supplier, in order to produce the highly innovative products created within this partnership project.<br>(CA1*) - As i said earlier, i do not involved in the commercialization activities within this partnership project and perhaps i do not realized that this project outcome can be commercialized as the objective is mainly due to fulfil social purpose. However, if this project outcome has the potential to be commercialized, factors such as financial assistance, manpower and infrastructures in regards with the commercialization activities need to be made available. | Same as above | Same as above | Same as above |

Table 4.14 (Continued)

| No. | Code item | Question items | Initial interview transcription | Operational data definition/ assumptions | Open codes | Theme |
|---|---|---|---|---|---|---|
| 12. | O5Q12 | In your opinion, what are the improvements or any added value that must be undertaken in order to make sure that the commercialization activities can be fully achieved in regards to the new highly innovative products, processes or services created within your partnership project? | (AA1*) - All partners must involve from the very beginning of the strategic knowledge management processes in order to successfully commercialize the product in any specific area of expertise. Commercialization of product can only be successful if there is a continuous direct involvement and assistance from the industry owner and also a very good rapport with industry owner. Giving high awareness and a very precise understanding to the industry partner on the benefits and other advantages that they might gain in terms of the outcome of the partnership project.<br>(IA1*) – We have differences in terms of primary mission, organization cultures, norms, values and actions. This must be well-manage and synchronised so that commercialization activities can be fully achieved within the partnership project. All partners must have a full commitments and capabilities (financial and non-financial terms) in regards to commercialization activities. Training and workshop on commercializing the products must be made available.<br>(CA1*) - Within this partnership project, we as the community partner only responsible in disseminating the new knowledge resource to other community members. Neither community leaders nor the community members see this special education module as a source of commercial value rather than only to fulfil social purpose and responsibility.(*) AA1 - Academic Actor 1; IA1 – Industry Actor 1; CA1 – Community Actor 1. | All actors highlighted recommendation and corrective actions that can be made in order to make improvements and add value in the knowledge application process. | (36) Continuous participation<br>(37) High commitment<br>(38) Good relationship<br>(39) Give awareness<br>(40) financial obligation<br>(41) Un-learn and re-learn attitude<br>(42) Synchronised objectives and motivation | Recommendation |

Based on table 4.14 above, interviewees were probe and asked questions on various issues and aspects in order to answer the two qualitative questions and objectives developed in this study. The open codes and main themes which emerged from the validation process highlighted in the table 4.14 above were also open codes and main themes in the main findings. Since the pilot study was used to fulfils the validation procedure of qualitative method of inquiry, the details discussion of the open codes and main themes of qualitative findings in the table 4.14 above will be further discuss and elaborate in more details in Chapter five.

The two interview sessions for pilot study were conducted between May and June 2016 involving 3 actors. The two interview sessions duration period are between half an hour to one and a half hour per session. For academic actor, the interview is conducted at their university office while for industry and community actor the interview sessions were taken place at their premise respectively. These interview sessions involves two partnership projects of Malaysian university-industry-community partnership ecosystem. Interviews from the pilot study were recorded, transcribed, open coded and make categorisation of main themes. The recorded interviews data were transcribe from the recorder as initial interview data transcription. Moreover, the initial interview data transcription is assume, operationalized and defined. Furthermore, from the operational definition, the open codes are derived through an open way and unfocused in order to identify the main themes. These open codes were then grouped as themes which have meaning, construe and relevance in order to answer the two questions and objectives of qualitative method of inquiry. The open codes and themes is derived based on suggestion outlined by Strauss and Corbin (1998) and Creswell (2013), whereby, they highlighted terms utilisation, actual terms and terms used in the related literature and theory understudy are the three main source in order to determine open codes and themes within the qualitative method of inquiry. There are as many as forty-two (42) open codes derive from all the three the sources mentioned above within the pilot study. In addition, a total of eight (8) main themes are derived in order to answer the two

qualitative research questions and objectives. For validation procedure, two academic experts and experienced qualitative researcher independently reviewing and scrutinised the initial interview transcripts, open codes and categorisation of main themes in order to reduce the element of bias and to have a highly credible qualitative findings and furthermore, to have an actual result of the experiences and ideas of the interviewees rather than based on the description and preference of the researcher.

This study adopts Cohen Kappa index analysis in order to fulfil the validation procedure. Cohen Kappa index of analysis is the analysis of qualitative method of inquiry which is done in order to search for an approval of expert's qualitative researchers on the validity procedure, conformation, significant and agreement of initial interview transcripts, operational definition and assumptions, open codes and main themes that were developed in the form of interview verbatim (Cohen, 1968; Fleiss, 1981; Yin, 1994). Cohen Kappa index of analysis determine to what extent that the initial interview transcripts, operational definition and assumptions, open codes and main themes were appropriated, suitable and reflect to answer the research question and objective understudy (Perreault & Leigh, 1989; Timbang et.al., 2010). According to Cohen (1968) and Fleiss (1981), as much as forty (40) items of open codes must be derived from the initial interview transcripts, operational definition and assumptions in order to assess the Cohen Kappa index of analysis and to have stability and construe an accurate meaning of each main theme. From the above statements, two experts of experienced qualitative researcher independently reviewing and scrutinised the initial interview transcripts, open codes and the main themes as outline in the table 4.14 above. This study used the formula of Cohen Kappa index of analysis as proposed by Yin (1994) and as shown in the table 4.15 below.

Table 4.15
Cohen Kappa Index of Analysis

Formula
K = (fa-fc) / (N-fc)
fa = frequency of agreement (Expert)
fc = frequency chance/ probability
N = Number of open code items

| No. | Expert 1 | Expert 2 | Overall Cohen Kappa index value | Cohen Kappa indicator index | |
|---|---|---|---|---|---|
| 1 | K = (37 – 21) / (42 – 21)<br>K = 16/ 21<br>K = 0.76 | K = (38 – 21) / (42 – 21)<br>K = 17/ 21<br>K = 0.81 | K = 0.76 + 0.81/ 2<br>**K = 0.78** | Very Good<br>Good<br>0.89<br>Average<br>0.69<br>Low/ Weak | > 0.90<br>0.70 -<br><br>0.30 -<br><br>< 0.30 |

Based on table 4.15 above, overall Cohen Kappa index value is K = 0.78. Landis and Koch (1977), Timbang et.al., (2010) and Miles et.al., (2013) has proposed method on how to interpret the value of Cohen Kappa index. They highlighted, (K) value that is above 0.70 suggests and show a strong and high agreement of initial interview transcripts, open codes and the main themes performed by researcher in answering the qualitative research objective and question. Moreover, (K) value of 0.30 to 0.69 is considered average and (K) value below 0.30 shows a weak agreement and low level of consistency of researcher interpretation of qualitative data analysis process. Thus, the (K) value of 0.78 retrieved in the validation procedure of this pilot study shows that the initial interview transcripts, open codes and the main themes have a highly credible of agreement and consistency which based on actual result of the experiences and ideas of the interviewees rather than based on the description and preference of the researcher. According to Cantor (1996) and Miles et.al., (2013), the value of Cohen Kappa index analysis (K) as the result of validation procedure of interview data during qualitative pilot study, is somewhat representing and reflect the overall value of Cohen Kappa index for all sample size being used in the study of qualitative method of inquiry. To elaborate further, they highlighted that this is because, the pattern of expert agreement and validation is consistent and generally the same, throughout all interview samples

used and this make up a strong and justified reason that the same results of Cohen Kappa value (K) can be repeatedly be obtained for all samples used. A study by Sim and Wright (2005) conclude that within the validation procedure undertaken in the preliminary findings of qualitative interview method, the degree of acceptability and reliability of initial interview transcripts, open codes and main themes shows in the Cohen Kappa index value (K) applied to all sample size and therefore, the question of the number of sample size requirement does not arise for validation procedure. Hence, the value of Cohen Kappa index analysis shows in the table 4.15 above is also representing and reflects the value of Cohen Kappa index analysis of the overall sample of twelve (12) interview sessions conducted in the qualitative method of inquiry of this study.

## 4.8 Summary of the Chapter

This chapter discussed on research design, data collection method, population and sampling method, model and measurement method of dependent and independent variables, controls variables and semi-structured interview protocol, data analysis techniques and also the pilot study conducted for both quantitative and qualitative method. This study will gather data from Malaysian university-industry-community partnership project under the RMK 10 plan (2011-2015) which involves 459 projects within 20 public universities and the involvement of 321 industries partners and also 138 community's partners. In answering the quantitative method, this study developed a total of 78 questions that need to be answer by the study respondents. These questions consist of 17 dependent variable questions, 37 independent variables questions and 24 control variables questions which are based on previous studies. This study also developed 12 semi-structured interview protocol questions in answering qualitative research objectives and questions of this study in supporting the main finding of quantitative method. This study will apply the analysis of data screening procedures which involves detection of missing data, outliers and non-response bias. Furthermore, this study analyse descriptive analysis, reliability and validity analysis, t-test analysis, assumption of multiple regression which involves normality test, linearity

test, homoscedasticity test, multi-collinearity test and followed by correlation analysis and hypothesis testing. This is the main finding of the study. In addition, for qualitative approach, the information gather from the interviewees will be tabulated and the data will be analysed and summarize accordingly with the theme. This study also conducted a pilot study of both quantitative and qualitative method as to support the main findings in the quantitative method. The pilot study was conducted for both methods in order to ensure the reliability and validity of instruments used in this study and also to fulfil the requirements and procedures of both quantitative and qualitative method before undergoing actual data collection.

# CHAPTER FIVE

# ANALYSIS OF FINDINGS

## 5.0 Introduction

This chapter presents the analysis and findings of the study. This chapter will begin with the analysis and findings of the quantitative method which acts as the main findings of this study. Next, this chapter will present and discuss the analysis and findings of the qualitative method of inquiry which acts as the supporting for the main quantitative results. Finally, this chapter concludes with the summary of both analysis and findings in order to answer the quantitative and qualitative objectives and questions developed in this study.

## 5.1 Analysis and Findings of Quantitative Method (Main findings)

This section presents the analysis and findings of quantitative method of this study in order to answer the three main findings of quantitative objectives namely: 1) to examine the relationship of knowledge creation process with social innovation within the context of Malaysian university-industry-community partnership ecosystem; 2) to examine the relationship of knowledge transfer process with social innovation within the context of Malaysian university-industry-community partnership ecosystem; and 3) to examine the relationship of knowledge application process with social innovation within the context of Malaysian university-industry-community partnership ecosystem.

From the above paragraph, to answer the three main findings of quantitative method of this study, the study has conducted analysis and shown findings in the aspects of background of the respondents, data cleaning procedures, descriptive analysis, t-test analysis, reliability and validity analysis, factor analysis as shown in the pilot study, assumption of multiple

regressions which involves diagnostic test namely; normality test, linearity test, homoscedasticity test, multi-collinearity test. Correlation and hypotheses analysis is conducted. For the background of the respondents, this study shows the distribution of respondent's profile in terms of age, gender, education level and type of partnership. Data cleaning procedures involve detection of missing data, outliers and non-response bias to make sure that the data used is clear from errors, and valid. Descriptive analysis is conducted to describe the characteristics of data in terms of mean value, standard deviation and level of value within the five (5) internal scale used. T-test analysis is conducted to find the mean difference between the groups of gender, education and types of partnership. Reliability and validity analysis was undertaken to ensure internal consistency of measurements of the items used and to ensure the measurement scales were accurately measured (Sekaran & Bougie, 2011).Assumption of multiple regressions which involves normality test, linearity test, homoscedasticity test. multi-collinearity test is done because it is a compulsory protocol prior to the conduct of multiple regression analysis to examine the relationship among variables developed for this study which involves correlation and hypotheses analysis. Correlation analysis is conducted to identify factors that have an association between variables used in the study and for hypothesis testing analysis is conducted to examine all the hypotheses developed in the three regression models developed in this study.



### 5.1.1 Background of the Respondents

Overall, this study distribute all 459 questionaires to the project leader of each project and 218 respondents replied to the questionnaires distributed. Majority of the respondents were age between 30 to 40 years old comprises 36.7% and followed by age between 41 to 50 years old comprises 33.5%. 63.8 percent of them were male compared to 36.2 percent of female respondents. The respondents that possess PhD degree have the higher percentage of 74.8%

as compared to the respondents that posses masters degree comprises only 25.2%. No respondents of the total 218 have lower education level than master degree. 41.3% of them were involved in the university-community partnership and 58.7% were in the university-industry partnership. Table 5.0 describes and summarises the background of the respondents.

Table 5.0
*Background of the Respondents (n=218)*

| | Frequency | Percentage |
|---|---|---|
| Age | | |
| <30 years | 4 | 1.8 |
| 30-40 years | 80 | 36.7 |
| 41-50 years | 73 | 33.5 |
| 51-60 years | 61 | 28.0 |
| | | |
| Gender | | |
| Male | 139 | 63.8 |
| Female | 79 | 36.2 |
| | | |
| Education Level | | |
| Masters Degree | 55 | 25.2 |
| PhD | 163 | 74.8 |
| | | |
| Type of Partnership | | |
| Community | 90 | 41.3 |
| Industry | 128 | 58.7 |



Figure 5.0 to 5.3 shows the distribution of respondents in terms of age, gender, education level, and type of partnership.

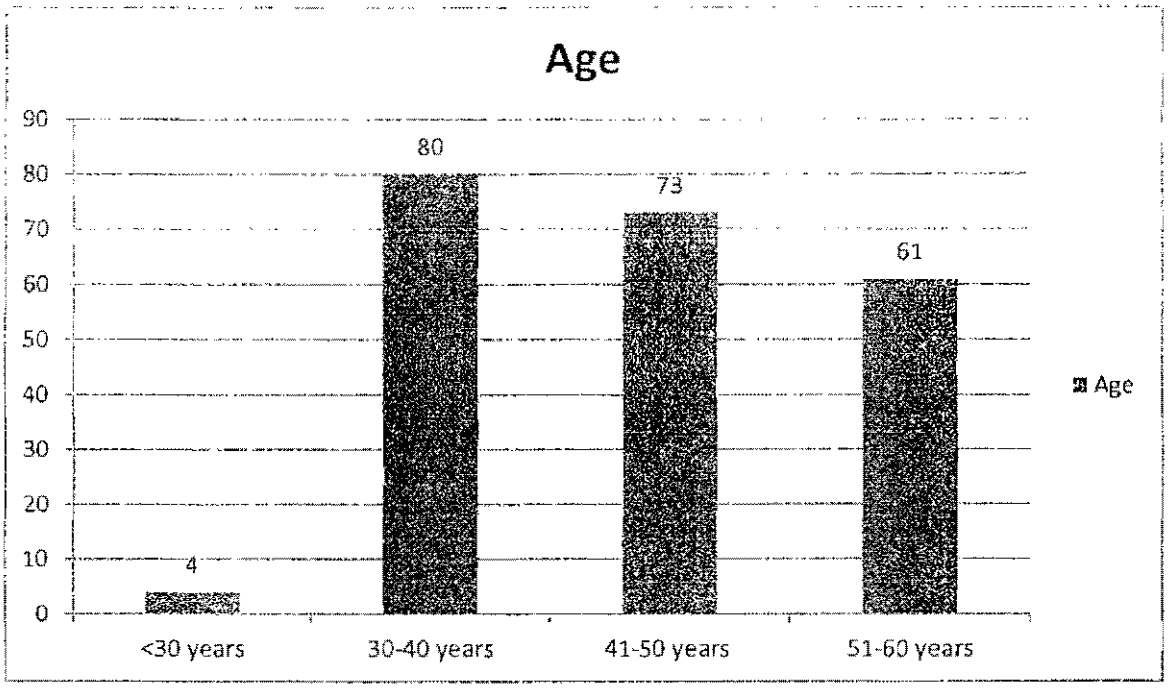



Figure 5.0
*Distribution of Respondents by Age (n=218)*

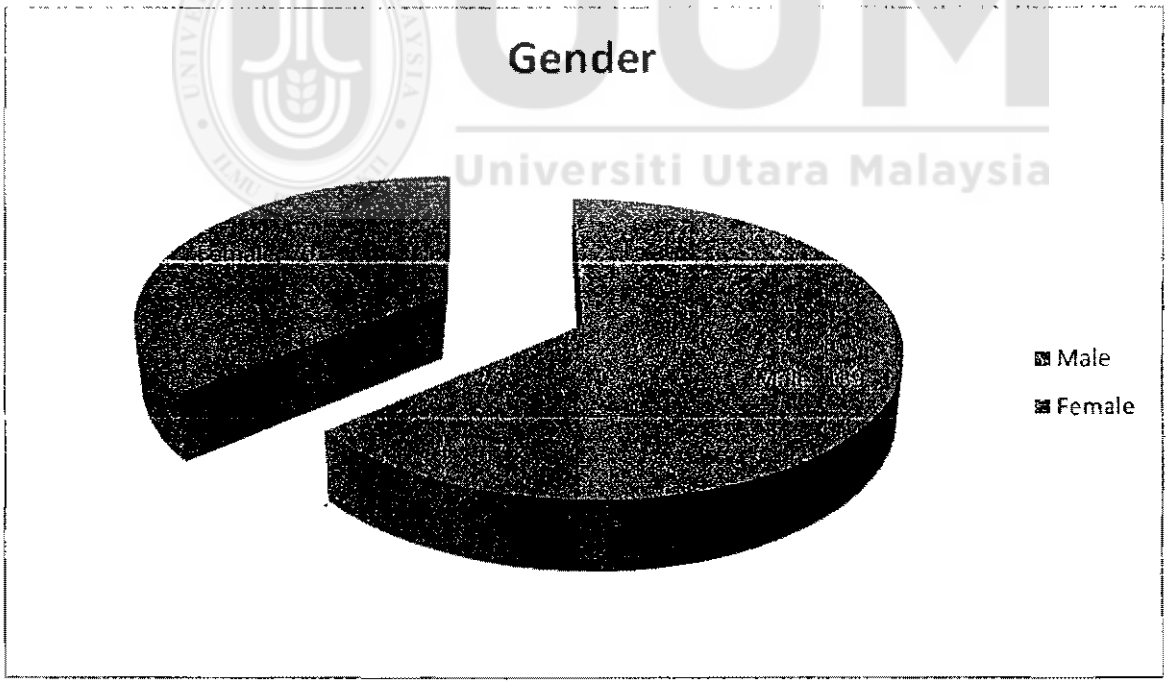



Figure 5.1
*Distribution of Respondents by Gender (n=218)*

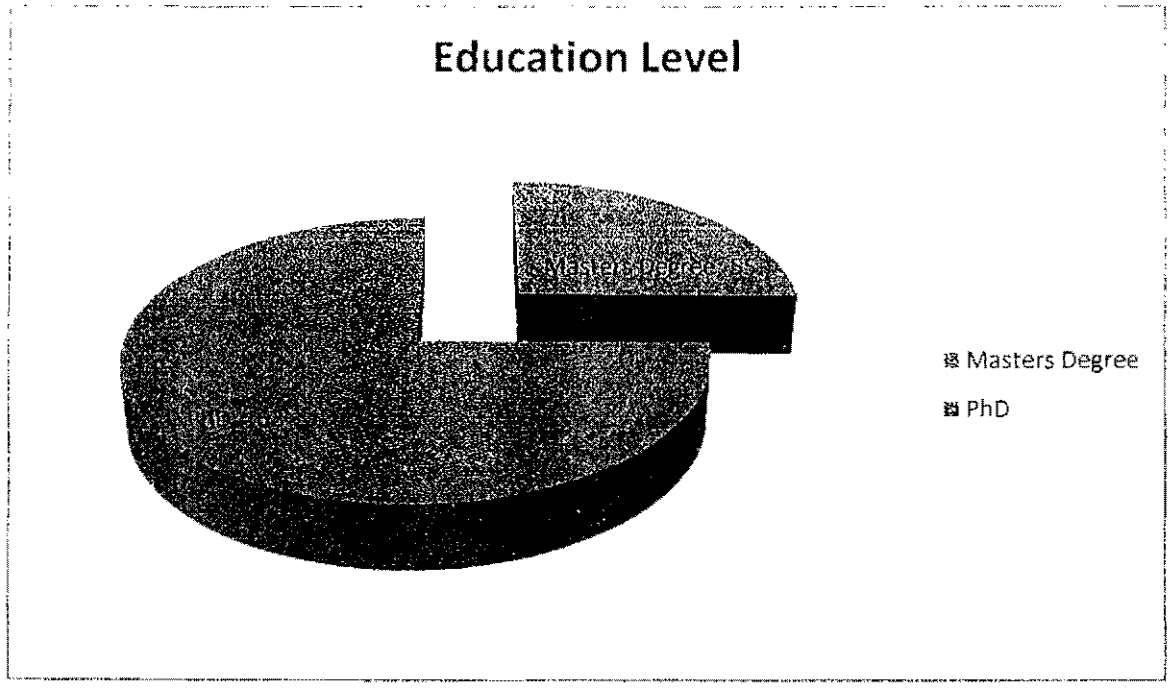



Figure 5.2
*Distribution of Respondents by Education Level (n=218)*

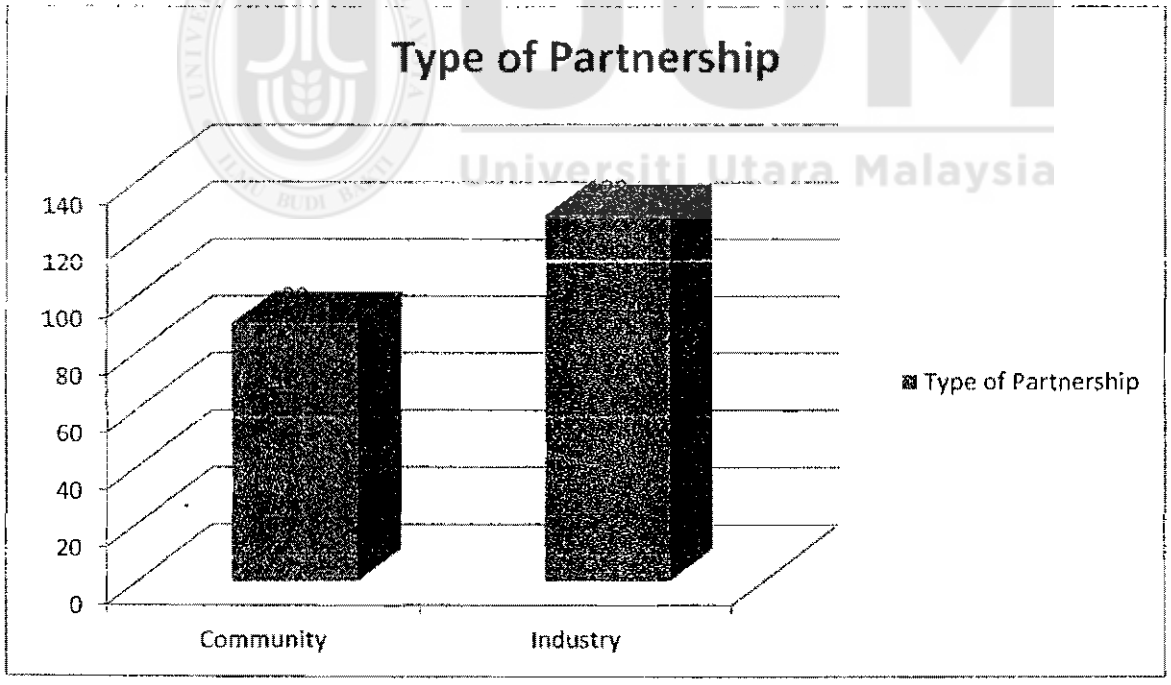



Figure 5.3
*Distribution of Respondents by Type of Partnership (n=218)*

### 5.1.2 Data Screening Procedures

This section discusses on the data screening procedures, which includes the detection of missing data, outliers, and non-response bias test.

#### 5.1.2.1 Detection of Missing Data

Hair, et. al., (2007) described missing data as information not available for a case about whom other information is available. Missing data for this study was reduced by checking for errors in all the variables at the point of time they were collected. For the surveys, any unanswered questions were referred the respondents. To ensure that all the data were cleaned, frequency distribution and missing value analysis for each variable were conducted. There was no missing data reported.



#### 5.1.2.2 Outliers

Outliers are cases whereby data values that are very different from the data values for the majority of cases in the data set. Outliers are important because they can change the results of our data analysis. Whether we include or exclude outliers from a data analysis depends on the reason why the case is an outlier and the purpose of the analysis. This study employed the Mahalanobis D2 to detect outliers. Mahalanobis D2 is a multidimensional version of a z-score. It measures the distance of a case from the centroid (multidimensional mean) of a distribution, given the covariance (multidimensional variance) of the distribution. A case is a multivariate outlier if the probability associated with its D2 is 0.001 or less. D2 follows a chi-square distribution with degrees of freedom equal to the number of variables included in the calculation. Data in this study shows no case with D2 score probability (p) less than 0.001. Thus, no case was treated as outliers and deleted from the data.

### 5.1.2.3 Non-Response Bias

Non-response bias occurs in statistical surveys if the answers of respondents differ from the potential answers of those who did not answer. For the purposes of this research, the non-response bias is defined as a bias that exists in survey results when respondents to a survey were different from those who did not respond in terms of demographic or attitudinal variables, or other variables relevant to the survey topic (Lambert & Harrington, 1990). According to Ellis et.al., (1970), it is a function of: (a) the proportion of non-respondents in the total sample and (b) the extent to which there is a systematic discrepancy between respondents and non-respondents on variables relevant to the inquiry. The presence of non-response bias is a threat to the external validity or generalizability of research findings to the target population of a study (Linder et.al., 2001). A well-designed survey and a research-based administration method, following generally acceptable protocols and procedures as well as reporting them in the research analysis, are the first-steps in the attempt to increase response rates and also control for non-response bias (Dillman. 2000; Porter. 2004). The approach used to test non-response bias is using independent sample T-test. For the purpose of this study, respondents from all over of Malaysia were selected. Mean score for all variables; were then computed for all respondent from each state. The mean scores were compared to examine the differences in each group (early- May to July 2016; late- Aug. to Oct.2016 reply) of responses. The results are shown in Table 5.1. It is found that there were no differences in the responses in all variables. Hence, the data used in this study is free from bias.

Table 5.1
*Independent sample T-test for Non-Response Bias Test*

| | F | Sig. |
|---|---|---|
| Workplace Innovation | 2.418 | .121 |
| Organization Innovation | 3.481 | .063 |
| Social Capital | .824 | .365 |
| Socialization | 1.905 | .169 |
| Externalization | 2.177 | .142 |
| Combination | .481 | .489 |
| Internalization | 2.731 | .100 |
| Communication | .818 | .367 |
| Transformation | .818 | .367 |
| Exploration | .475 | .491 |
| Exploitation | 3.313 | .070 |
| Leadership | .188 | .665 |
| Organization Structure | .647 | .422 |
| HRM | 1.202 | .274 |
| Trust | 2.375 | .125 |
| Social Ties | 1.514 | .220 |

### 5.1.3 Descriptive Analysis

There were a total of 218 usable samples taken from the survey. All the variables were measured on a five (5) internal scale i.e. ranging from 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree and 5 = strongly agree. According to Hair et al. (2006), mean values can be categorized into 3 levels namely; low, moderate, and high. Table 5.2 below shows the categories level of mean value:

Table 5.2
*Categorise Level of Mean Value*

| Category level | Mean range value |
|---|---|
| Low | 1.00 to 2.33 |
| Moderate | 2.34 to 3.66 |
| High | 3.67 to 5.00 |

Source: Hair et.al., (2006)

Base on table 5.2 above; the mean score ranges of 1.00 to 2.33 is low, 2.34 to 3.66 is considered moderate, and between 3.67 to 5.00 is high. The mean value, standard deviation and the categorisation level for the variables used in this study is shown in table 5.3 below:

Table 5.3
*Descriptive Analysis of the Variables*

| | Mean | Standard Deviation | Level |
|---|---|---|---|
| Dependent Variables | | | |
| **Social Innovation:** | **3.45** | **1.19** | **Moderate** |
| Workplace Innovation | 3.54 | 1.06 | Moderate |
| Organization Innovation | 3.30 | 1.36 | Moderate |
| Social Capital | 3.52 | 1.16 | Moderate |
| Independent Variables | | | |
| **Knowledge Creation** | **3.06** | **0.70** | **Moderate** |
| Socialization | 2.17 | 0.39 | Low |
| Externalization | 3.21 | 0.77 | Moderate |
| Combination | 3.50 | 0.85 | Moderate |
| Internalization | 3.46 | 0.77 | Moderate |
| **Knowledge Transfer:** | **3.40** | **0.80** | **Moderate** |
| Communication | 3.60 | 0.85 | Moderate |
| Transformation | 3.19 | 0.75 | Moderate |
| **Knowledge Application:** | **3.40** | **0.80** | **Moderate** |
| Exploration | 3.30 | 0.78 | Moderate |
| Exploitation | 3.51 | 0.80 | Moderate |
| Control Variables | | | |
| Leadership | 3.71 | 1.14 | High |
| Organization structure | 3.64 | 1.16 | Moderate |
| Human Resource Management | 3.16 | 1.15 | Moderate |
| Trust | 3.78 | 1.16 | High |
| Social Ties | 2.72 | 1.04 | Moderate |

As reflected in Table 5.3 above, the means value for overall variables used in this study are in the range of 2.17 to 3.78. This suggests that respondents were in an agreement with most of the variables and dimension examined in this study. Only socialization felt into low category. All the standard deviations were low suggesting the variability on the data (Sekaran, 2006).

In addition, table 5.4 show details of the means score of each item within all the variables i.e. dependent variables, independent variables, and control variables understudy.

Table 5.4
*Detail Means Score items of Dependent Variables, Independent Variables and Control Variables*

| **Dependent Variables: Social Innovation** | **Mean** | **Standard Deviation** | **Level** |
|---|---|---|---|
| **Social Innovation** | **3.45** | **1.19** | **Moderate** |
| **Work Place Innovation:** | **3.54** | **1.06** | **Moderate** |
| a1. Project management team allows work autonomy, empowerment and flexible working schedule. | 3.69 | 1.06 | High |
| a2. Project actors frequently work through partnership forum and team work. | 3.06 | 0.95 | Moderate |
| a3 Project management team constantly updating project process and allow job rotation among actors. | 3.25 | 1.04 | Moderate |
| a4. Project management team concern on the welfare and social security of the actors. | 4.13 | 0.92 | High |
| a5. Project leader provide individual support in enhancing actors human resource value through training, sharing knowledge and stimulate learning culture among actors. | 3.71 | 1.13 | Moderate |
| a6. The project outcome creates new solution, techniques and methods towards improving products, processes and services. | 3.42 | 1.27 | Moderate |
| **Organization Innovation** | **3.30** | **1.36** | **Moderate** |
| a7.The project management team allows decentralised decision making and flexible job responsibilities. | 3.26 | 1.36 | Moderate |
| a8.The project management team constantly encourage actor's social relationship as a medium to enhance social value and propensity to innovate towards project objective. | 3.46 | 1.34 | Moderate |
| a9.The project management team implement best practices and provide convenient environment throughout project duration to enhance actor's motivation, performance and participation. | 3.00 | 1.29 | Moderate |
| a10. The project management team constantly emphasizes on actor's integration between each other and working as a unit throughout project duration. | 3.00 | 1.20 | Moderate |
| a11.The project management team often restructure and redesign project process and structure to adapt to changes during the project duration. | 3.37 | 1.41 | Moderate |
| a12. The project management team often implement new administrative system to make the project more efficient and effective throughout the duration of the project. | 3.68 | 1.58 | High |

Table 5.4 (Continued)

| Dependent Variables: Social Innovation | Mean | Standard Deviation | Level |
|---|---|---|---|
| **Social Capital** | **3.52** | **1.16** | **Moderate** |
| a13.All actors in the project shared the same belief, motives and goals towards the success of the projeet. | 3.88 | 1.14 | High |
| a14.All actors in the project are highly trusted and have a high sense of trustworthiness in sharing knowledge. | 3.84 | 1.14 | High |
| a15.All actors in the project have close social relationship (example: recreational activities, informal gathering) with each other. motivation, performance and participation. | 2.23 | 1.17 | Low |
| a16.All actors frequently shared any knowledge and information regarding project matters with each other's to improve skills and capabilities. | 3.61 | 1.31 | Moderate |
| a17.New solution that can be embedded into products, processes and services is created from shared resources of project actors relationships. | 4.06 | 1.05 | High |

| Independent Variables: Knowledge Creation | Mean | Standard Deviation | Level |
|---|---|---|---|
| **Knowledge Creation** | **3.06** | **0.70** | **Moderate** |
| **Socialization** | **2.17** | **0.39** | Low |
| b18.All project actors spent a lot of time interacting through informal meeting and social activities in order to discuss and exchange ideas, experience and opinion. | 2.13 | 0.72 | Low |
| b19.The project management team allows sharing experience, observation, imitation and mentoring activities. | 2.22 | 0.65 | Low |
| b20.Project leader always encourage, motivate and guiding other project actors to have a formal and informal joint activities i.e. open dialogue, spending time together to share experience. | 2.15 | 0.73 | Low |
| b21.The environment within the project, take place in a high level of trust, interpersonal relationship, openness and low level of cultural and language differences. | 2.16 | 0.74 | Low |
| **Externalization** | **3.21** | **0.70** | Moderate |
| b22.All project actors participate in open dialogue and community of practice with each other to structure and record knowledge. | 2.16 | 0.74 | Low |
| b23.All project actors have a high sense of trust, high degree of communication, social eloseness and shared values. | 3.80 | 0.78 | High |
| b24.The project leader/ project management team listens to all opinions and recommendations from every project aetors. | 3.83 | 0.76 | High |
| b25.All project actors keep new knowledge in documentation i.e. database, intranet files and other computer software, that are easy to understand and shared to others. | 3.05 | 0.81 | Moderate |
| **Combination** | **3.50** | **0.85** | **Moderate** |
| b26. All project actors know very well about their roles and responsibility and have a positive attitude towards ICT | 3.83 | 0.78 | High |
| b27. The project management team equip actors with good ICT facilities and allow actors to access other related facilities. | 4.02 | 0.76 | High |

Table 5.4 (Continued)

| Independent variables: Knowledge Creation | Mean | Standard Deviation | Level |
|---|---|---|---|
| b28. All project actors are ICT literate in order to reconfigure, diffuse and systemize new knowledge. | 2.30 | 0.86 | Low |
| b29.All project actors frequently used ICT facilities in order to communicate and disseminate new knowledge to other actor. | 3.84 | 0.82 | High |
| **Internalization:** | **3.46** | **0.77** | **Moderate** |
| b30. Project explicit knowledge is written in comprehensive and well-structured documents. | 2.15 | 0.84 | Low |
| b31. The project always engages with practical activities such as learning by doing, experimenting, training and simulation. | 3.89 | 0.77 | High |
| b32. Project leader always tolerates failures and continuously encourage trial and error. | 3.91 | 0.71 | High |
| b33. Practical activities enhance all project actors tacit and personal knowledge. | 3.91 | 0.78 | High |

| Independent variables: Knowledge Transfer | Mean | Standard Deviation | Level |
|---|---|---|---|
| **Knowledge Transfer** | **3.40** | **0.80** | **Moderate** |
| **Communication** | **3.60** | **0.85** | **Moderate** |
| b34. All project actors frequently communicate new knowledge with each other through verbal and non-verbal approach. | 3.91 | 0.83 | High |
| b35. All project actors regularly donating and collecting new knowledge with each other. | 3.48 | 0.90 | Moderate |
| b36 All project actors can communicate with each other effectively and efficiently. | 3.70 | 0.69 | High |
| b37. All project actors can express new knowledge and ideas clearly | 3.45 | 0.93 | Moderate |
| b38. Project leader always play as a leading role in established a constructive communication climate throughout project duration. | 3.47 | 0.92 | Moderate |
| **Transformation** | **3.19** | **0.75** | **Moderate** |
| b39.All project actors have the ability to transform new knowledge into practical work. | 2.61 | 0.92 | Moderate |
| b40. All project actors record and store new knowledge for future reference. | 3.67 | 0.80 | High |
| b41. All project actors are capable to absorb new knowledge and prepare it for further purposes and to make it available. | 2.35 | 0.67 | Moderate |
| b42. All project actors are aware of their competencies to eliminate obselete old knowledge and replace it with newly acquired knowledge for new innovation. | 3.67 | 0.66 | High |
| b43. All project actors regularly meet to discuss on the progress of transformation and utilisation of new acquired knowledge towards products, processes and services development. | 3.67 | 0.70 | High |

Table 5.4 (Continued)

| Independent Variables: Knowledge Application | Mean | Standard Deviation | Level |
|---|---|---|---|
| **Knowledge Application** | **3.40** | **0.80** | **Moderate** |
| **Exploration** | **3.30** | **0.78** | **Moderate** |
| b44. The project invents and introduces new products, processes and services that are completely new. | 3.61 | 0.68 | Moderate |
| b45. The project leader regularly organised special meeting with other actors to acquire new knowledge. | 3.32 | 0.99 | Moderate |
| b46. All project actors accept instruction that go beyond existing policy and procedures to develop new products, processes and services. | 3.61 | 0.74 | Moderate |
| b47. The project management team thoroughly observed technological trends and public demands throughout project duration. | 2.38 | 0.72 | Moderate |
| b48.Project actors frequently utilised new knowledge opportunity throughout project duration. | 3.58 | 0.65 | Moderate |
| **Exploitation** | **3.51** | **0.69** | **Moderate** |
| b50. The project improves existing products, processes and services within the project. | 3.38 | 0.76 | Moderate |
| b51. Project leader regularly reviewsthe development of products, processes and services to exploit of new knowledge. | 3.49 | 0.75 | Moderate |
| b52. All project actors are capable of recognising the usefulness of new knowledge to combine with existing knowledge within the project. | 3.53 | 0.82 | Moderate |
| b53.All project actors are capable in sharing new knowledge to improve and refine existing products, processes and services. | 3.58 | 0.84 | Moderate |
| b54.It is clearly known among actors how activities within the project should be performed. | 3.48 | 0.95 | Moderate |

| Control Variables: Leadership, Organization Structure, Human Resource Management, Trust, Social Ties | Mean | Standard Deviation | Level |
|---|---|---|---|
| **Leadership** | **3.71** | **1.14** | **High** |
| c55.Project leader articulates clear project vision, mission and objectives to other actors. | 3.65 | 1.24 | Moderate |
| c56.Project leader regularly helps other actors to increase level of enthusiasm and inteliectual stimulation. | 3.65 | 1.11 | Moderate |
| c57.Project leader always capable in giving inspirational motivation and guiding other actors to perform related job. | 3.69 | 1.12 | Moderate |
| c58. Project leader frequently initiates meeting and leadsdiscussion on any particular issues arise in the project. | 3.83 | 1.14 | High |
| c59. Project leader always guidesother actors to look at problems from many different angles. | 3.77 | 1.10 | High |
| **Organization Structure** | **3.64** | **1.16** | **Moderate** |
| c60. Our project management team provides other actors with easy access to various sources of information. | 3.88 | 1.11 | High |
| c61.Our project management team allows decentralised decision making made by the project actors. | 3.87 | 1.22 | High |

Table 5.4 (Continued)

| Control Variables: Leadership, Organization Structure, Human Resource Management, Trust, Social Ties | Mean | Standard Deviation | Level |
|---|---|---|---|
| c62.Our project management team/ KTP project secretariat provides adequate resources (ex. financial and non-financial) for actors to think of creative solution and to explore innovative ideas. | 2.50 | 1.21 | Moderate |
| c63.Our project management team/ KTP project secretariat holds innovative actors and projects in high regard. | 3.83 | 1.05 | High |
| c64.Our project management team/ KTP project secretariat is tolerant of mistakes. | 4.12 | 1.24 | High |
| **HRM** | **3.16** | **1.15** | **Moderate** |
| c65.Project actors were rigorously recruited by the project leader in hiring process. | 2.23 | 1.15 | Low |
| c66. The project management team frequently provide continuous developmental training opportunities for project actors. | 2.98 | 1.22 | Moderate |
| c67.Our project encourages empowerment and high participation among actors. | 3.13 | 1.15 | Moderate |
| c68. Our project activities involve a lot of teamwork rather than individual work. | 3.85 | 1.11 | High |
| c69.Our project management team/ KTP project secretariat regularly rewards and appraised project actors when they perform excellently. | 3.61 | 1.12 | Moderate |
| **Trust** | **3.78** | **1.16** | **High** |
| c70. We strongly believed that every project actor would not try to take advantage with each another. | 3.53 | 1.24 | Moderate |
| c71.We strongly believed that every project actor keep their words and promises with regards to project matters. | 3.61 | 1.09 | Moderate |
| c72. We strongly believed that our welfare, desire and needs are priority to the project management team/ KTP project secretariat. | 3.62 | 1.21 | Moderate |
| c73. We feel very confident on every project team actor capabilities towards achieving project objectives. | 4.08 | 1.14 | High |
| c74.All project actors have benefited from this partnership. | 4.06 | 1.10 | High |
| **Social Ties** | **2.72** | **1.04** | **Moderate** |
| c75. Our project actors frequently havea formal and informal face to face meeting with each other. | 2.24 | 1.18 | Low |
| c76. We frequently discuss in person with other actors regarding project matters rather than looking at documents for information. | 2.91 | 1.23 | Moderate |
| c77.We frequently meet outside the project formal activities to socialise and discuss with each other. | 2.31 | 0.94 | Low |
| c78.Our project actors regularly used other method such as social media to interact with each other. | 3.43 | 0.86 | Moderate |

Table 5.4 above describes the details of the descriptive analysis which involves mean value, standard deviation and the level category of the three main variables understudy namely; dependent, independent and control variables. It can be found that 61 out of a total of 78 items which comprises 17 items in the dependent variables, 47 items in the independent variables and 24 items in the control variables showed the high mean score of more than 3.00. Only 17 items were found to be lower than the mean value of 3.00. Specifically, item no. a4 *"Project management team concern on the welfare and social security of the actors"* representing workplace innovation under dependent variable scores the highest mean value as compared to the rest of the items (mean=4.13, sd=0.92, level= high). Furthermore, item no. b18 namely; *"All project actors spent a lot of time interacting through informal meeting and social activities in order to discuss and exchange ideas, experience and opinions"*- under the category of socialization in the knowledge creation dimension scores the lowest mean value as compared to the rest of the items (mean=2.13, sd=0.72, level= low). For the overall descriptive analysis of all the variables used in this study, the result shows that the dimension of trust score the highest mean value (mean=3.78, sd=1.16, level= high). Socialization dimension shows the lowest mean value (mean=2.17, sd=0.39, level= low).



The results also indicates that the mean score of 28 items out of 78 items were high (mean= 3.67 to 5.00), 39 items were moderate (mean= 2.34 to 3.66) and 11 items were fall under low category (1.00 to 2.33). Interestingly, the results shows that socialization dimension under knowledge creation that consist of items *b18- All project actors spent a lot of time interacting through informal meeting and social activities in order to discuss and exchange ideas, experience and opinions; b19- The project management team allows sharing experience, observation, imitation and mentoring activities; b20- Project leader always encourage, motivate and guiding other project actors to have a formal and informal joint activities i.e.*

*open dialogue, spending time together to share experience; and b21- The environment within the project take place in a high level of trust, interpersonal relationship, openness and low level of cultural and language differences*; all scores low category of mean value ranging from the minimum of 2.13 to 2.22 (b18: mean= 2.13; b19: mean= 2.22; b20: mean= 2.15; b21: mean= 2.16). The socialization dimension under knowledge creation is developed in order to measure the integration and leverage tacit knowledge resource from one person to another through the conversion process of tacit knowledge resource. New tacit knowledge resource can be achieved through socialization activities which involve individuals shared experience and hands-on experience, informal social meeting and interactions, observations, and imitations (Nonaka et. al., 2001). Literature suggests that, tacit knowledge resource is an inimitable competitive advantage (Lubit, 2001). As for the results of socialization dimension above, it indicates that actors within the Malaysian university-industry-community partnership project ecosystem lack of socialization, in terms of social networks interactions i.e. learning from hands-on experience, informal social meeting and social interactions, observations and imitations; in order to harness new tacit knowledge resource from one actor to another which is very much important, critical and valuable for the Malaysian university-industry-community partnership projects.



In the similar characteristic with socialization dimension of knowledge creation items, items no. *a15- All actors in the project have close social relationship (example: recreational activities, informal gathering) with each other-* under the social capital dimension of social innovation had also scored low mean value of (mean=2.23, sd=1.17, level= low). Furthermore, item no. *b22- All project actors participate in open dialogue and community of practice with each other to structure and record knowledge-* of externalization dimension of knowledge creation also indicates low mean value of (mean=2.16, sd=0.74, level= low). Item

no. *c75- Our project actors frequently having a formal and informal face to face meeting with each other-* of social ties under control variables scores low mean value of (mean=2.24, sd=1.18, level= low) and item no. *c77- We frequently meet outside the project formal activities to socialise and discuss with each other's-* of social ties under control variables also shows low mean value of (mean=2.31, sd=0.86, level= low). Simultaneously, in other measurement aspects, item no. *c65- Project actors were rigorously recruited by the project leader in hiring process-* under human resource management of control variables indicates low mean value of (mean=2.23, sd=1.15, level= low). The low mean value of item no. c65 indicates that the selection process of actors to be participating in the project of the Malaysia university-industry-community partnership is not being done in a rigorous and thorough manner. Rossi and Rosli, (2013) highlighted that the heterogeneous pools of actors, each with their own characteristics, purposes and structures can often lead to conflicting objectives and agendas when collaborating within the university-industry-community partnership. Hence, the selection of actors is a crucial process in order to achieve the harmonised environment among them in terms of high understanding, commitment and involvement (Cosh & Hughes, 2010). Furthermore, item no. *b28- All project actors are ICT literate in order to reconfigure, diffuse and systemize new knowledge resource-* under combination dimension of knowledge creation indicates low mean value of (mean=2.30, sd=0.86, level= low). Item no. b28 reflect in terms of lack of understanding and practical use of information communication technology among actors within the Malaysia university-industry-community partnership project. Leng and Shepherdson, (2000) and Venters, (2010) stressed that, information communication technology helps a lot in terms of managing and retaining new knowledge resource and expertise. Finally, item no. *b30- Project explicit knowledge is written in comprehensive and well-structured documents-* under the dimension of

internalization of knowledge creation also scores low mean value of (mean=2.15, sd=0.84, level= low).

### 5.1.4 T-Test Analysis

T-test analysis is conducted in order to find the mean difference between the groups of gender, education and types of partnership.

#### 5.1.4.1 Gender

Independent sample t-test was conducted to examine the perceived differences in terms of high agreement in social innovation and its dimension between genders. Result is summarised in Table 5.5 below. It is found in Table 5.5 that there is a significant difference on social innovation by the agreement of male and female respondents ($t=6.163$, $p<0.01$). The agreement of male respondents on social innovation is higher as compared to female respondents (mean-male= 3.461; mean-female= 3.254). It is also found that male and female have difference views in workplace innovation ($t=5.188$, $p<0.01$), whereby male respondents have a higher agreement of workplace innovation (mean-male= 3.420; mean-female= 3.209). Organization innovation has no significant difference between gender. For social capital, there is a significant difference between male and female ($t=4.710$, $p<0.01$), where male respondents have a higher agreement of social innovation as compared to female (mean-male= 3.516; mean-female= 3.318). It also found that male respondents have the higher agreement towards all variables as compared to female respondents.

Table 5.5:
*Differences in Social Innovation by Gender*

| | Mean | | T | Sig. |
|---|---|---|---|---|
| | Male | Female | | |
| Social Innovation | 3.461 | 3.254 | 6.163 | .001 |
| Workplace innovation | 3.420 | 3.209 | 5.188 | .008 |
| Organization Innovation | 3.447 | 3.236 | 5.023 | .082 |
| Social Capital | 3.516 | 3.318 | 4.710 | .048 |

### 5.1.4.2 Education Level

Independent sample t-test was conducted to examine the perceived differences in social innovation and its dimension by education level. Result is summarised in Table 5.6 below. It is found in Table 5.6 that there is a significant difference in social innovation by agreement in terms of education level of PhD and Master degree ($t=-9.463$, $p<0.05$). The agreement of PhD holder actors on social innovation is higher as compared to Master degree holder actors (mean-PhD holder actors= 3.467; mean-Master degree holder actord= 3.147). Interestingly, for the dimensions of social innovation which comprises workplace innovation, organization innovation, and social capital, the independent sample t-test results shows no significant difference between Phd and Master degree holder actors.

Table 5.6
*Differences in Social Innovation by Education Level*

| | Mean | | T | Sig. |
|---|---|---|---|---|
| | Master Degree | PhD | | |
| Social Innovation | 3.147 | 3.467 | -9.463 | .081 |
| Workplace | 3.097 | 3.427 | -7.839 | .897 |
| Organization | 3.131 | 3.452 | -7.279 | .345 |
| Social Capital | 3.212 | 3.523 | -7.035 | .514 |

### 5.1.4.3 Type of Partnership

Independent sample t-test was conducted to examine the perceived differences in social innovation and its dimension between type of partnership i.e. the university-industry and the university-community partnership. Result is summarised in Table 5.7 below. It is found in Table 5.7 that there is a significant difference in social innovation by the agreement of university-industry partnership and university-community partnership ($t=16.340$, $p<0.01$). The agreeement of university-industry partnership on social innovation is higher as compared to university-community partnership (mean-university-industry partnership =3.547; mean-university-community partnership =3.158). It is also found that the university-industry partnership and the university-community partnership have different views in the dimension of social capital ($t=-11.213$, $p<0.01$), where the university-industry partnership has a higher agreement of social capital (mean- university-industry partnership=3.604; mean- university-community partnership= 3.218). As for workplace innovation and organization innovation, there has no significant difference between the types of partnership i.e. the university-industry, and the university-community partnership.



Table 5.7
*Differences in Social Innovation by Type of Partnership*

| | Mean | | T | Sig. |
|---|---|---|---|---|
| | Community | Industry | | |
| Social Innovation | 3.158 | 3.547 | -16.340 | .000 |
| Workplace innovation | 3.106 | 3.511 | -12.731 | .247 |
| Organization innovation | 3.151 | 3.525 | -10.676 | .141 |
| Social Capital | 3.218 | 3.604 | -11.213 | .047 |

### 5.1.5 Reliability Analysis

This section shows the analysis and findings of the reliability test of the actual sampel size of 218 respondents within this study. Reliability test is to ensure internal consistency of measurements of the items used (Sekaran & Bougie, 2011). From the above statements, for reliability test, according to Hair et. al., (2010) the rule of thumb for the acceptance level of Cronbach's alpha value must be higher than 0.70. The cut-off point for measuring the reliability items measurement for this study is coefficient alpha value of above 0.70 as recommended by Hair et. al., (2010). Table 5.8 exhibits the Cronbach coefficient alpha value of the variables collected from the 218 respondents represented by the project leader i.e. academic actors; of the Malaysian university-industry-community partnership projects. All the variables in this study have the Cronbach's alpha values of more than 0.70. In addition, the results of the reliability test that comprises the actual sample size of 218 respondents in the table 5.8 below has taken into account the construct validity i.e. factor analysis. (Zikmund, 2003) that was undertaken in the pilot study section.

Table 5.8
*Reliability Coefficients for Variables*

| Variable | Original Item (N) | Item deleted (factor analysis) | N of item | Cronbach Alpha |
|---|---|---|---|---|
| Social Innovation | 17 | 1 | 16 | 0.784 |
| Workplace Innovation | 6 | 1 | 5 | 0.732 |
| Organization Innovation | 6 | - | 6 | 0.916 |
| Social Capital | 5 | - | 5 | 0.895 |
| Strategic Knowledge Management | 37 | 6 | 31 | 0.816 |
| Knowledge Creation | 16 | 2 | 14 | 0.893 |
| Socialization | 4 | - | 4 | 0.739 |
| Externalization | 4 | - | 4 | 0.755 |
| Combination | 4 | - | 4 | 0.744 |
| Internalization | 4 | 2 | 2 | 0.742 |
| Knowledge Transfer | 10 | 2 | 8 | 0.858 |
| Communication | 5 | 2 | 3 | 0.783 |
| Transformation | 5 | - | 5 | 0.777 |
| Knowledge Application | 11 | 2 | 9 | 0.747 |
| Exploration | 5 | - | 5 | 0.737 |
| Exploitation | 6 | 2 | 4 | 0.736 |
| Control Variable | 24 | - | 24 | |
| Leadership | 5 | - | 5 | 0.774 |
| Organization structure | 5 | - | 5 | 0.736 |
| HRM | 5 | - | 5 | 0.774 |
| Trust | 5 | - | 5 | 0.756 |
| Social Ties | 4 | - | 4 | 0.739 |
| Total | 78 | 7 | 71 | |



As revealed in Table 5.8 above, coefficient alphas for all study variables were above the acceptable level of 0.70 (Cavana et. al., 2001; Hair et.al., 2010) ranging from a minimum of 0.732 to 0.916. The overall social innovation has the Cronbach's alpha value of 0.784, comprises the dimension of workplace innovation which has the Cronbach's alpha value of 0.732, organization innovation 0.916, and social capital 0.895. The strategic knowledge management shown the Cronbach's alpha value of 0.816, comprises knowledge creation dimension score the Cronbach's alpha value of 0.893, knowledge transfer 0.858 and knowledge application 0.747. Control variable that is represented by leadership has the Cronbach's alpha value of 0.774, organization structure 0.736, followed by human resource

management that have the Cronbach's alpha value of 0.774, trust 0.756 and social ties 0.739. Accordingly, no items were deleted from the present scales. All the variables in this study have values above 0.70. Overall, the analysis indicated that each instrument was meaningfully measured and represented by reliable items. The above Cronbach's alpha value shows that the index had high reliability. All the items within the variables understudy is measured by using5 point likert-scale, ranked from 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree and 5 = strongly agree. The data were collected from May 2016 to October 2016. These questionnaires were delivered to all the 459 projects of Malaysia university-industry-community partnership through personal administered and internet mail in order to measure the relationship of strategic knowledge management processes i.e. knowledge creation, knowledge transfer, and knowledge application; with social innovation within the context of Malaysian university-industry-community partnership ecosystem. Specifically, as many as 280 questionnaires were distributed through personal administered and the balance of 179 was distributed through internet mail. This study was able to receive 218 feedbacks all together from the academic actors that act as the project leader of each partnership project. From the table 5.8 above, the original items of variables understudy is 78 items comprise17 items of dependent variable, 37 items of independent variable and 24 items of control variable. 7 items were deleted comprise 1 item of dependent variable and 6 items of independent variable due to the low anti-image correlation matrix of factor loading value below 0.40 within the factor analysis of construct validity. The items deleted are a2- Project actors frequently work through partnership forum and team work, b31- The project always engages with practical activities such as learning by doing, experimenting, training and simulation. b33- Practical activities enhance all project actors' tacit and personal knowledge, b34- All project actors frequently communicate new knowledge with each other through verbal and non-verbal approach, b36- All project actors can communicate with each other

effectively and efficiently, b53- All project actors are capable in sharing new knowledge to improve and refine existing products, processes and services and b54- It is clearly known among actors how activities within the project should be performed.

### 5.1.6 Validity Analysis: Face or Content Validity and Construct Validity- Factor Analysis as shows in the Pilot Study.

The two validity analysis to test the actual sample size of 218 were content or face validity and construct validity- factor analysis (Zikmund, 2003). Content or face validity is concerned with the degree that the scale items represent the domain of the concept under study (Bagozzi et.al., 1991) and it involves a systematic and subjective assessment (Hair et. al., 2007). This test was carried out during the pre-test stage where the measurement scales were reviewed by two quantitative experts, whom area research specialistsin the area of quantitative method of analysis within the area of accounting and management. The reason this was done was to solicit feedback if any revision or modification is needed to the scale. Upon receipt of the feedback, changes were made accordingly. Furthermore, construct validity deals with the degree to which the construct or scale represents and acts like the concept being measured (Bagozzi et.al., 1991). The construct validity was assessed from both the theoretical and statistical perspective. The instruments for the variables in this study were established from previous studies that supported the theoretical construct validity. The principal technique that was performed on all the constructs to support the statistical construct validity was to examine the Varimax rotation Principal Components Analysis (PCA). Tabachnick and Fidell (2001) fully supported the PCA for the factor extraction over the Explanatory Factor Analysis (EFA) especially for empirical summary of data set. All the factors for variables in this study were considered as multi-dimensional. The purpose is to validate the scales and determine the factor loading. All the independent and dependent variables were submitted to PCA to determine their factor loading. As a rule of thumb, Tabachnick and Fidell, (2001) suggested

that only a variable with a loading of 0.32 and above should be considered. For this study, based on the size of loadings which were influenced by homogeneity of scores in the samples, a factor loading which is higher than 0.40 will be considered.

Tabachnick and Fidell (2001) have indicated that in order to conduct factor analysis, a total number of more than 150 samples would be ideal. For this study, an actual sample size of 218 were employed. Another consideration for factor analysis as suggested by Tabachnick and Fidell (2001) is Maiser-Meyer-Olkin (KMO) statistic should be a minimum of 0.6 (Kaiser, 1970). If this value falls below the minimum value, it is recommended that either more date be collected or that other variables should be included (Field, 2009). The outcomes of the factor analysis of all the variables understudy is shown in the table 4.7- 4.10, pages 196-203 in the validity analysis section of pilot study of quantitative method of analysis.

### 5.1.7 Assumption of Multiple Regressions

Prior to using multiple regression analysis to explore relationships among variables understudy namely; dependent variable, independent variable, and control variable, all the assumptions recommended by Tabachnick and Fidell (2001) have been fulfilled, such as 1) normality, 2) linearity, 3) homodescedascity of residuals and 4) multi-collinearity and singularity. All of the aforementioned assumption of multiple regressions above is shown below:

### 5.1.7.1 Normality Test

The normality of distribution of data was examined by the skewness and kurtosis values for each variable. Skewness values present the symmetry of the distribution score and a skew variable's mean will not be at the center of this distribution; while kurtosis confer information about the "peakness" of distribution which can be either too peaked (with short and thick tail) or too flat (with long and thin tail) (Tabachnick & Fidell, 2001). Normal distribution is considered when the value of skewness and kurtosis is at zero (0). Positive skewness value will have a cluster of cases to the left at a low value and negative skewness will have the score cluster or pile at the right side with a long left tail (Tabachnick & Fidell, 2001). Kurtosis with values of below zero (0) will indicate a relative flat distribution known as "playkurtic" and the kurtosis values above zero (0) indicate a peak distribution or "leptokurtic". T is recommended by researchers that samples be large enough (minimum 200) to prevent under-estimation of variance. Seldom will perfect normality assumption be achieved. Table 5.9 is a summary of the kurtosis and skewness for all the variables. The data shows the variables were normally distributed. Therefore, in conclusion, all the variables do not deviate the normality test requirement.

Table 5.9
*Skewness and Kurtosis for Variables Understudy*

| Construct | Skewness Stats | Std Error | Kurtosis Stats | Std Error |
|---|---|---|---|---|
| Social Innovation | | | | |
| Workplace Innovation | -.304 | .165 | -.691 | .328 |
| Organization Innovation | -.160 | .165 | -1.300 | .328 |
| Social Capital | -.047 | .165 | -1.335 | .328 |
| Knowledge Creation | | | | |
| Socialization | 6.33 | 0.75 | -.745 | -.706 |
| Externalization | .708 | .165 | 1.667 | .328 |
| Combination | .379 | .165 | .357 | .328 |
| Internalization | .012 | .165 | -.176 | .328 |
| Knowledge Transfer | | | | |
| Communication | .050 | .165 | .131 | .328 |
| Transformation | .537 | .165 | .516 | .328 |
| Knowledge Application | | | | .328 |
| Exploration | .236 | .165 | .287 | .328 |
| Exploitation | .448 | .165 | -.094 | .328 |
| Control Variables | | | | |
| Leadership | .169 | .165 | .509 | .328 |
| Organization Structure | .210 | .165 | .724 | .328 |
| HRM | .058 | .165 | .311 | .328 |
| Trust | -.013 | .165 | -.164 | .328 |
| Social Ties | -.129 | .165 | -.072 | .328 |

### 5.1.7.2 Linearity Test

Another assusmption to meet is linearity of data which is the relationship between the residuals against the predicted values. Linearity refers tothe error term of distribution. Linearity is important for the regression analysis because correlation can capture only the linear association between variables and if there are substantial non-linear relationship, it will be ignored in the analysis because it will underestimate the actual strength of the relationship (Tabachnick & Fidell, 2007). Linearity can be observed by examining the scatterplots (Hair et. al., 2006). The results of linearity through scatter plot diagrams for various variables indicate no clear relationship between the residuals and the predicted values. Assessment of all scatterplots of the standardized residual versus standardized predicted values revealed that in all the plots the residual were scattered with no systematic or curvilinear pattern (U shape distribution) or clustering or residuals as indicated by Tabachnick and Fidell (2007). The randomized pattern of the scatter plots indicated that the assumption of linearity was met.

Therefore, the linearity could be assumed. Figure 5.4 shows the scatterpolts of standardized residuals against the predicted values of linearity test.

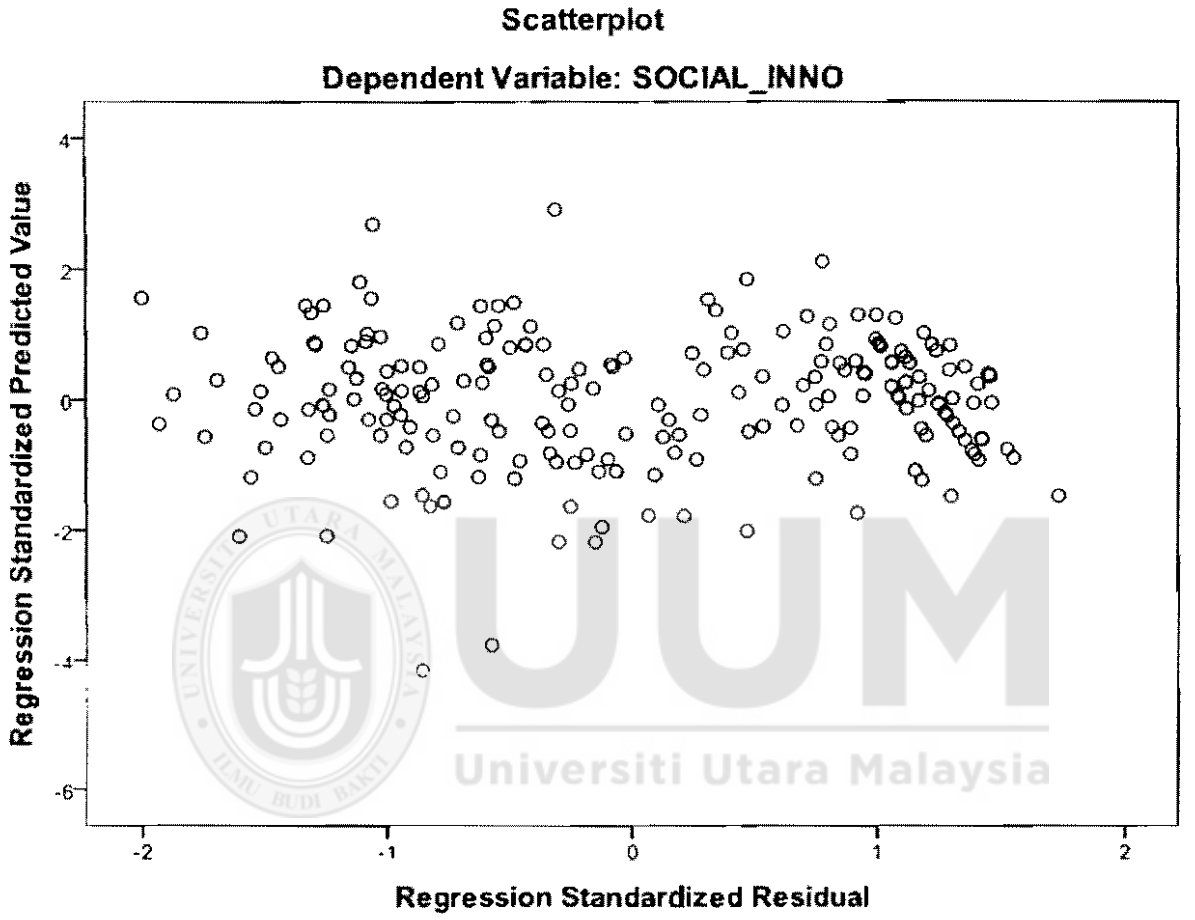



Figure 5.4
*Scatterpolts of Standardized Residuals against the Predicted Values of Linearity Test*

### 5.1.7.3 Homoscedasticity Test

Homoscedasticity refers to constant variance of the error term and the variance of the dependent variables is approximately the same different levels of the explanatory variable (Hair et al., 2006). Homoscedasticity is indicated when the width of the band of the residuals is approximately the same at the different level of the dependent variables and scatter plot show a pattern of residual normally distributed around the mean. To check the

Homoscedasticity, the scatterplots of studentized residual against the predicted values were used (Hair et al., 2006). There is a need to inspect the plots of residual against the predicted values to reveal that the residuals were scattered randomly with no obvious systematic pattern. If there is no systematic pattern of decreasing of increasing residuals, it can be assumed that the assumption of Homoscedasticity is not violated. Figure 5.5 below shows the scatterpolts of studentized residuals against the predicted values of Homoscedasticity test.

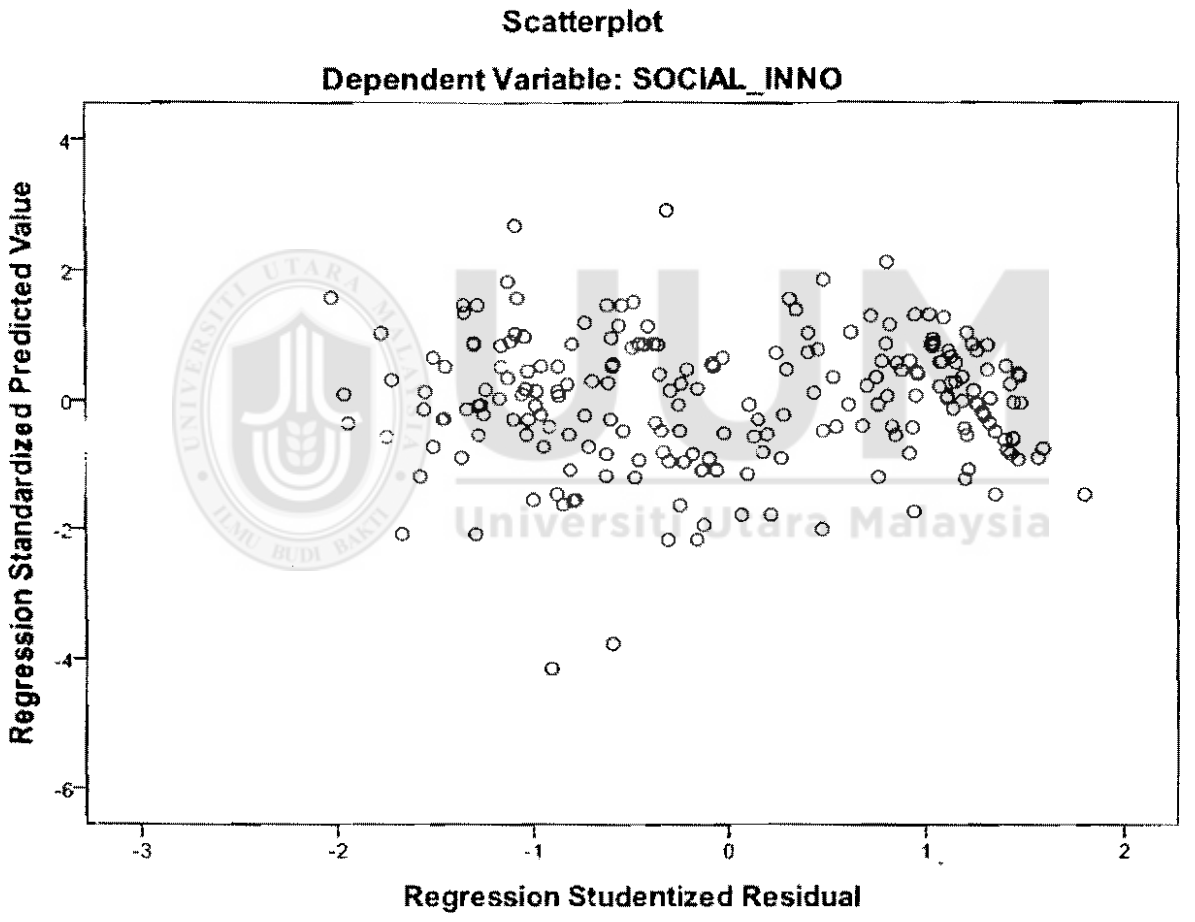



Figure 5.5
*Scatterpolts of Studentized Residuals against the Predicted Values of Homoscedasticity test*

### 5.1.7.4 Multi-Collinearity Test

The second assumption pertains to multicollinearity and singularity which are related to the correlations between the predictors' variables. Singularity occurs when one of the independent variables merged with other independent variables (Tabachnick & Fidell, 2001). Multicollinearity posses a problem for multiple regression when the independent variables are highly correlated (r = 0.8 and above). When such cases happen, the regression coefficients would not be significant due to high standard error. According to Tabachnick and Fidell (2001), tolerance values approaching zero (0) specify the presence of high multicollinearity. The cut-off value for Variance Inflation Factor (VIF) is less than 10 and tolerance value of more than 0.1. Hence, as reported, there is no violation of the assumption for this study. All the independent variables' tolerance value of more than 0.1 and VIF value of less than 10. Table 5.10 below indicates the value of the multi-collinearity.

Table 5.10
*Test of Multi-Collinearity*

| | Tolerance | VIF |
|---|---|---|
| Socialization | .863 | 1.158 |
| Externalization | .800 | 1.249 |
| Combination | .729 | 1.371 |
| Internalization | .722 | 1.386 |
| Communication | .589 | 1.697 |
| Transformation | .473 | 2.114 |
| Exploration | .539 | 1.855 |
| Exploitation | .580 | 1.724 |
| Leadership | .566 | 1.765 |
| Organization Structure | .764 | 1.309 |
| HRM | .415 | 2.408 |
| Trust | .376 | 2.661 |
| Social Ties | .521 | 1.921 |

### 5.1.8 Correlation Analysis

In order to identify the factors that have an association with social innovation, the correlation analysis was conducted where the correlation coefficient illustrates the relationship between the independent and dependent variables. According Hair et. al., (2006), the number representing the Pearson correlation is referred to as a correlation coefficient. It ranges from – 1.00 to + 1.00, with zero representing absolutely no association between the two metric variables. The larger the correlation coefficient the stronger the linkage or level of association. A strong correlation is represented by a coefficient exceeding the value of 0.5 whereas a medium or modest correlation is when the coefficient has a value of between 0.5 and 0.2. Any coefficient possessing a value less than 0.2 will be deemed as showing a weak correlation. Benny and Feldman (1985) suggested a rule of thumb, that the correlation coefficients that exceed 0.8 (very strong correlation) will likely to result in multi-colinearity. Cohen (1988) has put forward a guideline on the effect sizes of the correlation coefficients in social science studies as: small effect size, $r = 0.1 - 0.29$, medium: $r = 0.30 - 0.49$, and large: $r = 0.50$. Result of correlation analysis can be found in Table 5.11, 5.12, 5.13 and 5.14.

Table 5.11 below exhibits the results of correlations analysis to examine the relationship between social innovation, strategic knowledge management processes and control variables used in the study. It was found that overall. social innovation is significantly associated with strategic knowledge management processes ($r=0.600$, $p<0.01$). It is also found that social innovation showed the significant relationship with socialization ($r=0.203$, $p<0.01$), externalization ($r=0.389$, $p<0.01$), combination ($r=0.318$, $p<0.01$), internalization ($r=0.398$, $p<0.01$), communication ($r=0.316$, $p<0.01$), transformation ($r=0.264$, $p<0.01$), exploration ($p=0.265$, $p<0.01$) and exploitation ($r=0.269$, $p<0.01$). In addition, social innovation also indicates the significant relationship with all the control variables used in this study, where

leadership ($r=0.635$, $p<0.01$), organization structure ($r=0.522$, $p<0.01$), HRM ($r=0.650$, $p<0.01$), trust ($r=0.698$, $p<0.01$) and social ties ($r=0.494$, $p<0.01$).

Table 5.11

*Correlation Analysis of Social Innovation, Strategic Knowledge Management Processes and Control Variables*

| | Social Innovation | Knowledge Managment | Know. Creation | Socialization | Externalization | Combination | Internalization | Know. Transfer | Communication | Transformation | Know. Application | Exploration | Exploitation | Leadership | Organization Structure | HRM | Trust | Social Ties |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Social Innovation | 1 | | | | | | | | | | | | | | | | | |
| SKM | .600** | 1 | | | | | | | | | | | | | | | | |
| Know. Creation | .484** | .638** | 1 | | | | | | | | | | | | | | | |
| Socialization | .203** | .302** | .505** | 1 | | | | | | | | | | | | | | |
| Externalization | .389** | .433** | .677** | .065 | 1 | | | | | | | | | | | | | |
| Combination | .318** | .484** | .785** | .249** | .362** | 1 | | | | | | | | | | | | |
| Internalization | .398** | .498** | .724** | .199** | .362** | .406** | 1 | | | | | | | | | | | |
| Knowl. Transfer | .325** | .680** | -.022 | -.038 | -.003 | -.035 | .015 | 1 | | | | | | | | | | |
| Communication | .316** | .615** | .045 | -.066 | .026 | .031 | .119 | .891** | 1 | | | | | | | | | |
| Transformation | .264** | .597** | -.085 | -.002 | -.032 | -.093 | -.092 | .890** | .587** | 1 | | | | | | | | |
| Knowl. Application | .301** | .625** | -.066 | -.053 | -.054 | -.074 | .005 | .567** | .419** | .592** | 1 | | | | | | | |
| Exploration | .265** | .525** | -.112 | -.135* | -.032 | -.135* | -.003 | .497** | .337** | .549** | .910** | 1 | | | | | | |
| Exploitation | .269** | .590** | .008 | .064 | -.067 | .021 | .014 | .510** | .415** | .495** | .856** | .566** | 1 | | | | | |
| Control Variables | | | | | | | | | | | | | | | | | | |
| Leadership | .635** | .102 | .104 | -.034 | .126 | .055 | .123 | 012 | .028 | -.007 | .065 | .084 | .024 | 1 | | | | |
| Org. Structure | .522** | .066 | .065 | .026 | .109 | .026 | 015 | 087 | 118 | .036 | -.043 | -.002 | -.084 | .371** | 1 | | | |
| HRM | .650** | .064 | .131 | .080 | .176** | .014 | 101 | 009 | 031 | -.015 | -.070 | -.084 | -.035 | .563** | .379** | 1 | | |
| Trust | .698** | .142* | .154* | .015 | .166* | .102 | 124 | 056 | 056 | .043 | .030 | .008 | .049 | .563** | .381** | .704** | 1 | |
| Social Ties | .494** | -.053 | -.002 | -.057 | .068 | -.057 | 042 | -.074 | -.085 | -.047 | -.042 | -.040 | -.033 | .493** | .241** | .565** | .637** | 1 |

Notes: ** p<0.01, *p<0.05

Further inspection in Table 5.12, shows the results of correlations analysis to examine the relationship among workplace innovation, strategic knowledge management processes and the control variables. It was found that overall, workplace innovation is significantly associated with strategic knowledge management processes ($r=0.448$, $p<0.01$). It is also found that workplace innovation also showed the significant relationship with the entire dimension in strategic knowledge management processes. Workplace innovation showed the significant relationship with socialization ($r=0.160$, $p<0.05$), externalization ($r=0.233$, $p<0.01$), combination ($r=0.279$, $p<0.01$), internalization ($r=0.301$, $p<0.01$), communication ($r=0.250$, $p<0.01$), transformation ($r=0.191$, $p<0.01$), exploration ($p=0.180$, $p<0.01$) and exploitation ($r=0.209$, $p<0.01$). Furthermore, workplace innovation also showed a significant relationship with control variables namely: Leadership ($r=0.582$, $p<0.01$), organization structure ($r=0.411$, $p<0.01$), HRM ($r=0.614$, $p<0.01$), trust ($r=0.660$, $p<0.01$) and social ties ($r=0.478$, $p<0.01$).

Table 5.12

*Correlation Analysis of Workplace Innovation, Strategic Knowledge Management Processes and Control Variables*

| | Workplace Innovation | Knowledge Management | Know. Creation | Socialization | Externalization | Combination | Internalization | Know. Transfer | Communication | Transformation | Know. Application | Exploration | Exploitation | Leadership | Organization Structure | HRM | Trust | Social Ties |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Work Place Innov | 1 | | | | | | | | | | | | | | | | | |
| SKM | .448** | 1 | | | | | | | | | | | | | | | | |
| Know. Creation | .362** | .638** | 1 | | | | | | | | | | | | | | | |
| Socialization | .160* | .302** | .505** | 1 | | | | | | | | | | | | | | |
| Externalization | .233** | .433** | .677** | .065 | 1 | | | | | | | | | | | | | |
| Combination | .279** | .484** | .785** | .249** | .362** | 1 | | | | | | | | | | | | |
| Internalization | .301** | .498** | .724** | .199** | .362** | .406** | 1 | | | | | | | | | | | |
| Knowl. Transfer | .248** | .680** | -.022 | -.038 | -.003 | -.035 | .015 | 1 | | | | | | | | | | |
| Communication | .250** | .615** | .045 | -.066 | .026 | .031 | .119 | .891** | 1 | | | | | | | | | |
| Transformation | .191** | .597** | -.085 | -.002 | -.032 | -.093 | -.092 | .890** | .587** | 1 | | | | | | | | |
| Knowl. Application | .217** | .625** | -.066 | -.053 | -.054 | -.074 | .005 | .567** | .419** | .592** | 1 | | | | | | | |
| Exploration | .180** | .525** | -.112 | -.135* | -.032 | -.135* | -.003 | .497** | .337** | .549** | .910** | 1 | | | | | | |
| Exploitation | .209** | .590** | .008 | .064 | -.067 | .021 | .014 | .510** | .415** | .495** | .856** | .566** | 1 | | | | | |
| Control variables | | | | | | | | | | | | | | | | | | |
| Leadership | .582** | .102 | .104 | -.034 | .126 | .055 | .123 | .012 | .028 | -.007 | .065 | .084 | .024 | 1 | | | | |
| Org. Structure | .411** | .066 | .065 | .026 | .109 | .026 | .015 | .087 | .118 | .036 | -.043 | -.002 | -.084 | .371** | 1 | | | |
| HRM | .614** | .064 | .131 | .080 | .176** | .014 | .101 | .009 | .031 | -.015 | -.070 | -.084 | -.035 | .563** | .379** | 1 | | |
| Trust | .660** | .142* | .154* | .015 | .166* | .102 | .124 | .056 | .056 | .043 | .030 | .008 | .049 | .563** | .381** | .704** | 1 | |
| Social Ties | .478** | -.053 | -.002 | -.057 | .068 | -.057 | .042 | .074 | -.085 | -.047 | -.042 | -.040 | -.033 | .493** | .241** | .565** | .637** | 1 |

Notes: ** p<0.01, *p<0.05

Next, table 5.13 shows the inspection on the relationship between organization innovation, strategic knowledge management processes and control variables understudy. It was found that organization innovation showed the significant relationship with overall strategic knowledge management processes ($r=0.514$, $p<0.01$). Furthermore, it was also found that organization innovation also showed the significant relationship with the entire dimension in strategic knowledge management processes. The results of correlation indicates that organization innovation have a significant relationship with socialization ($r=0.187$, $p<0.01$), externalization ($r=0.413$, $p<0.01$), combination ($r=0.222$, $p<0.01$), internalization ($r=0.415$, $p<0.01$), communication ($r=0.201$, $p<0.01$), transformation ($r=0.201$, $p<0.01$), exploration ($p=0.262$, $p<0.01$) and exploitation ($r=0.183$, $p<0.01$). In additon, organization innovation have significant relationship with leadership ($r=0.512$, $p<0.01$), organization structure ($r=0.459$, $p<0.01$), HRM ($r=0.484$, $p<0.01$), trust ($r=0.525$, $p<0.01$) and social ties ($r=0.352$, $p<0.01$).

Table 5.13

*Correlation Analysis of Organization Innovation, Strategic Knowledge Management Processes and Control Variables*

| | Organization Innovation | Knowledge Management | Know. Creation | Socialization | Externalization | Combination | Internalization | Know. Transfer | Communication | Transformation | Know. Application | Exploration | Exploitation | Leadership | Organization Structure | HRM | Trust | Social Ties |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Organization Innov | 1 | | | | | | | | | | | | | | | | | |
| SKM | .514** | 1 | | | | | | | | | | | | | | | | |
| Know. Creation | .453** | .638** | 1 | | | | | | | | | | | | | | | |
| Socialization | .187** | .302** | .505** | 1 | | | | | | | | | | | | | | |
| Externalization | .413** | .433** | .677** | .065 | 1 | | | | | | | | | | | | | |
| Combination | .222** | .484** | .785** | .249** | .362** | 1 | | | | | | | | | | | | |
| Internalization | .415** | .498** | .724** | .199** | .362** | .406** | 1 | | | | | | | | | | | |
| Knowl. Transfer | .226** | .680** | -.022 | -.038 | -.003 | -.035 | .015 | 1 | | | | | | | | | | |
| Communication | .201** | .615** | .045 | -.066 | .026 | .031 | .119 | .891** | 1 | | | | | | | | | |
| Transformation | .201** | .597** | -.085 | -.002 | -.032 | -.093 | -.092 | .890** | .587** | 1 | | | | | | | | |
| Knowl. Application | .256** | .625** | -.066 | -.053 | -.054 | -.074 | .005 | .567** | .419** | .592** | 1 | | | | | | | |
| Exploration | .262** | .525** | -.112 | -.135* | -.032 | -.135* | -.003 | .497** | .337** | .549** | .910** | 1 | | | | | | |
| Exploitation | .183** | .590** | .008 | .064 | -.067 | .021 | .014 | .510** | .415** | .495** | .856** | .566** | 1 | | | | | |
| Control Variables | | | | | | | | | | | | | | | | | | |
| Leadership | .512** | .102 | .104 | -.034 | .126 | .055 | .123 | .012 | .028 | -.007 | .065 | .084 | .024 | 1 | | | | |
| Org. Structure | .459** | .066 | .065 | .026 | .109 | .026 | .015 | .087 | .118 | .036 | -.043 | -.002 | -.084 | .371** | 1 | | | |
| HRM | .484** | .064 | .131 | .080 | .176** | .014 | .101 | .009 | .031 | -.015 | -.070 | -.084 | -.035 | .563** | .379** | 1 | | |
| Trust | .525** | .142* | .154* | .015 | .166* | .102 | .124 | .056 | .056 | .043 | .030 | .008 | .049 | .563** | .381** | .704** | 1 | |
| Social Ties | .352** | -.053 | -.002 | -.057 | .068 | -.057 | .042 | -.074 | -.085 | -.047 | -.042 | -.040 | -.033 | .493** | .241** | .565** | .637** | 1 |

Notes: ** p<0.01, *p<0.05

Table 5.14 below reveals the relationship between social capital, strategic knowledge management processes and it control variables understudy. Social capital showed the significant association to the strategic knowledge management processes in overall ($r=0.528$, $p<0.01$). Social capital is also found to have a significant relationship with all the dimension of strategic knowledge management processes as follows: socialization ($r=0.157$, $p<0.05$), externalization ($r=0.319$, $p<0.01$), combination ($r=0.291$, $p<0.01$), internalization ($r=0.272$, $p<0.01$), communication ($r=0.334$, $p<0.01$), transformation ($r=0.263$, $p<0.01$), exploration ($p=0.215$, $p<0.01$) and exploitation ($r=0.276$, $p<0.01$). It is also found that, all the dimension of control variables also significantly associated with social capital, leadership ($r=0.487$, $p<0.01$), organization structure ($r=0.427$, $p<0.01$), HRM ($r=0.520$, $p<0.01$), trust ($r=0.551$, $p<0.01$) and social ties ($r=0.400$, $p<0.01$).

Table 5.14

*Correlation Analysis of Social Capital, Strategic Knowledge Management Processes and Control Variables*

| | Social Capital | Knowledge Management | Know. Creation | Socialization | Externalization | Combination | Internalization | Know. Transfer | Communication | Transformation | Know. Application | Exploration | Exploitation | Leadership | Organization Structure | HRM | Trust | Social Ties |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Social Capital | 1 | | | | | | | | | | | | | | | | | |
| SKM | .528** | 1 | | | | | | | | | | | | | | | | |
| Know. Creation | .388** | .638** | 1 | | | | | | | | | | | | | | | |
| Socialization | .157* | .302** | .505** | 1 | | | | | | | | | | | | | | |
| Externalization | .319** | .433** | .677** | .065 | 1 | | | | | | | | | | | | | |
| Combination | .291** | .484** | .785** | .249** | .362** | 1 | | | | | | | | | | | | |
| Internalization | .272** | .498** | .724** | .199** | .362** | .406** | 1 | | | | | | | | | | | |
| Knowl. Transfer | .335** | .680** | -.022 | -.038 | -.003 | -.035 | .015 | 1 | | | | | | | | | | |
| Communication | .334** | .615** | .045 | -.066 | .026 | .031 | .119 | .891** | 1 | | | | | | | | | |
| Transformation | .263** | .597** | -.085 | -.002 | -.032 | -.093 | -.092 | .890** | .587** | 1 | | | | | | | | |
| Knowl. Application | .273** | .625** | -.066 | -.053 | -.054 | -.074 | .005 | .567** | .419** | .592** | 1 | | | | | | | |
| Exploration | .215** | .525** | -.112 | -.135* | -.032 | -.135* | -.003 | .497** | .337** | .549** | .910** | 1 | | | | | | |
| Exploitation | .276** | .590** | .008 | .064 | -.067 | .021 | .014 | .510** | .415** | .495** | .856** | .566** | 1 | | | | | |
| Control Variables | | | | | | | | | | | | | | | | | | |
| Leadership | .487** | .102 | .104 | -.034 | .126 | .055 | .123 | .012 | .028 | -.007 | .065 | .084 | .024 | 1 | | | | |
| Org. Structure | .427** | .066 | .065 | .026 | .109 | .026 | .015 | .087 | .118 | .036 | -.043 | -.002 | -.084 | .371** | 1 | | | |
| HRM | .520** | .064 | .131 | .080 | .176** | .014 | .101 | .009 | .031 | -.015 | -.070 | -.084 | -.035 | .563** | .379** | 1 | | |
| Trust | .551** | .142* | .154* | .015 | .166* | .102 | .124 | .056 | .056 | .043 | .030 | .008 | .049 | .563** | .381** | .704** | 1 | |
| Social Ties | .400** | -.053 | -.002 | -.057 | .068 | -.057 | .042 | -.074 | -.085 | -.047 | -.042 | -.040 | -.033 | .493** | .241** | .565** | .637** | 1 |

Notes: ** p<0.01, *p<0.05

### 5.1.9 Hypotheses Testing Analysis

The main objectives of this study is to address three research questions and objectives of quantitative method in this study namely; 1) To examine the relationship of knowledge creation process with social innovation within the context of Malaysian university-industry-community partnership ecosystem; 2) To examine the relationship of knowledge transfer process with social innovation within the context of Malaysian university-industry-community partnership ecosystem; 3) To examine the relationship of knowledge application process with social innovation within the context of Malaysian university-industry-community partnership ecosystem. Hence, this study had developed three regression models to be tested. The dependent variable of this study is social innovation and is represented by three dimensions of dependent variable namely: *workplace innovation, organization innovation, and social capital*. Moreover, this study developed three main independent variables i.e. knowledge creation, knowledge transfer and knowledge application which involved eight dimensions of independent variables i.e. *socialization, externalization, combination, and internalization* – Knowledge creation; *communication and transformation* – Knowledge transfer; and *exploration and exploitation* – Knowledge application. The study considers leadership, organization structure and human resource management as control variables for workplace and organization innovation and trust and social ties is the control variables for social capital. The development of the above related variables is to answer the main objectives of this study which is to examine the relationship of knowledge creation, knowledge transfer and knowledge application towards social innovation in the context of Malaysian university-industry-community partnership ecosystem.

From the above paragraph, model 1 represents workplace innovation, strategic knowledge management processes i.e. knowledge creation, knowledge transfer, and knowledge application and leadership organization structure and human resource management as its control variables. Model 2 represents by Organization innovation, strategic knowledge management processes i.e. knowledge creation, knowledge transfer, and knowledge application and leadership organization structure and human resource management as its control variables and Model 3 represents by social capital, strategic knowledge management processes i.e. knowledge creation, knowledge transfer, and knowledge application and trust and social ties as its control variables. These models were also use to test all the 24 hypotheses developed in this study.

### 5.1.9.1 Model 1: Workplace Innovation

Model 1 attempted to test the effect of knowledge creation, knowledge transfer, knowledge application, and control variables (Leadership, organization structure and HRM) on workplace innovation. Result of regression analysis is as exhibits in Table 5.15. It can be found that knowledge creation, knowledge transfer, knowledge creation, and all the control variables explained 63.8 percent of workplace innovation ($R^2$=0.638 F=33.015, p<0.01). Only two dimensions of knowledge creation were significantly predicted workplace innovation. They were combination (B=0.204, t=4.120, p<0.01) and internalization (B=0.124, t=2.503, p<0.05). For socialization and externalization dimension of knowledge creation, the results indicates no significant effect on workplace innovation (p>0.05). Next, both dimensions in knowledge transfer and knowledge application successfully predicted workplace innovation as follows: communication (B=0.094, t=2.263, p<0.05), transformation (B=0.112, t=2.185, p<<0.05), exploration (B=0.114, t=1.967, p<0.05), and exploitation (B=0.184, t=2.507, p<0.05). All three control variables were also significantly predicted workplace innovation as

follows: leadership (B=0.265, t=4.967, p<0.01), organization structure (B=0.147, t=3.103, p<0.01) and HRM (B=0.399, t=7.415, p<0.01). Thus, the general regression equation can be stated as follows: Workplace Innovation = 0.472 + 0.074$Soc_i$ + 0.000$Ext_i$ + 0.204$Comb_i$ + 0.124$Int_i$ + 0.094$Comm_i$ + 0.112$Trans_i$ + 0.114$Explo_i$ + 0.184$Exploit_i$ + 0.265$Lead_i$ + 0.147$Orgstruct_i$ + 0.399$HRM_i$ + $\bar{e}$.

Table 5.15
*Effect of Knowledge Creation, Knowledge Transfer and Knowledge Application and Control Variables i.e. Leadership, Organization Structure, HRM on Workplace Innovation*

| | B | T | Sig. |
|---|---|---|---|
| Socialization | .074 | 1.620 | .107 |
| Externalization | .000 | -.033 | .268 |
| Combination | .204 | 4.120 | .000** |
| Internalization | .124 | 2.503 | .013* |
| Communication | .094 | 2.263 | 045* |
| Transformation | .112 | 2.185 | .037* |
| Exploration | .114 | 1.967 | .049* |
| Exploitation | 184 | 2.507 | .033* |
| Leadership | .265 | 4.967 | .000** |
| organization structure | .147 | 3.103 | .002** |
| HRM | .399 | 7.415 | .000** |
| $R^2$ | 0.638 | | |
| F | 33.015 | | |
| Sig. | 0.000 | | |

Notes: ** p<0.01; * p<0.05

### 5.1.9.2 Model 2: Organization Innovation

Next, Model 2 attempted to test the effect of knowledge creation, knowledge transfer, knowledge application, and control variables (Leadership, organization structure and HRM) on organization innovation. Result of regression analysis is as exhibits in Table 5.16. It can be found that knowledge creation, knowledge transfer, knowledge creation and control variables explained 64.5 percent of organization innovation ($R^2$=0.645, F=34.041, p<0.01). Two out of

four dimensions of knowledge creation were significantly predicted organization innovation. They were externalization (B=0.224, t=4.745, p<0.01), internalization (B=0.263, t=5.345, p<0.01). For socialization and combination dimension of knowledge creation, the results indicates no significant effect on organization innovation (p>0.05). Next, both dimension in knowledge transfer and knowledge application successfully predicted organization innovation as follows: communication (B=0.127, t=3.486, p<0.05), transformation (B=0.104, t=1.716, p<0.05), exploration (B=0.212, t=3.678, p<0.01) and exploitation (B=0.150, t=1.911, P<0.05). For control variables that compriseleadership, organization structure and HRM, all are successfully predicted organization innovation as follows: Leadership (B=0.222, t=4.200, p<0.01), Organization structure (B=0.273, t=5.804, p<0.01) and HRM (B=0.201, t=3.775, p<0.01). Thus, the general regression equation can be stated as follows: Organization Innovation = -0.059 + 0.023$Soc_i$ + 0.224$Ext_i$ + 0.019$Comb_i$ + 0.263$Int_i$ + 0.127$Comm_i$ + 0.104$Trans_i$ + 0.212$Explo_i$ + 0.150$Exploit_i$ + 0.222$Lead_i$ + 0.273$Orgstruct_i$ + 0.201$HRM_i$ + $\tilde{e}$



Table 5.16
*Effect of Knowledge Creation, Knowledge Transfer and Knowledge Application and Control Variables i.e. Leadership, Organization Structure, HRM on Organization Innovation*

| | B | T | Sig. |
|---|---|---|---|
| Socialization | .023 | .737 | .067 |
| Externalization | .224 | 4.745 | .000** |
| Combination | .019 | .386 | .700 |
| Internalization | .263 | 5.345 | .000** |
| Communication | .127 | 3.486 | .027* |
| Transformation | .104 | 1.716 | .048* |
| Exploration | .212 | 3.678 | .000** |
| Exploitation | .150 | 1.911 | .043* |
| Leadership | .222 | 4.200 | .000** |
| organization structure | .273 | 5.804 | .000** |
| HRM | .201 | 3.775 | .000** |
| $R^2$ | 0.645 | | |
| F | 34.041 | | |
| Sig. | 0.000 | | |

Notes: ** p<0.01; * p<0.05

### 5.1.9.3 Model 3: Social Capital

Next, Model 3 attempted to test the effect of knowledge creation, knowledge transfer, knowledge application, and control variables (Trust and Social Ties) on social capital. Result of regression analysis is as exhibits in Table 5.17. It can be found that knowledge creation, knowledge transfer, knowledge creation, and control variables explained 59.7 percent of social capital ($R^2$=0.597, F=24.711, p<0.01). Only two dimensions of knowledge creation were significantly predicted social capital. They were combination (B=0.189, t=3.623, p<0.01) and internalization (B=0.163, t=2.205, p<0.05). For socialization and externalization dimension of knowledge creation, the results indicates no significant effect on social capital (p>0.05). Next, both dimensions in knowledge transfer and knowledge application successfully predicted social capital as follows: communication (B=0.142, t=2.425, p<0.05), transformation (B=0.124, t=3.308, p<0.01), exploration (B=0.097, t=1.411, p<0.05) and exploitation (B=0.149, t=2.541, t=0.05). For control variables that comprises trust and social ties, all are successfully predicted social capital as follows: Trust (B=0.192, t=3.400, p<0.01) and Social Ties (B=0.212, t=4.229, p<0.01). Thus, the general regression equation can be stated as follows: Social Capital = $0.360 + 0.077Soc_i + 0.034Ext_i + 0.189Comb_i + 0.163Int_i + 0.142Comm_i + 0.124Trans_i + 0.097Explo_i + 0.149Exploit_i + 0.192Trust_i + 0.212Socties_i + \bar{e}$

Table 5.17

*Effect of Knowledge Creation, Knowledge Transfer and Knowledge Application and Control Variables i.e. Trust, Social Ties on Social Capital*

| | B | T | Sig. |
|---|---|---|---|
| Socialization | .077 | 1.599 | .111 |
| Externalization | .034 | 1.678 | .088 |
| Combination | .189 | 3.623 | .000** |
| Internalization | .163 | 2.205 | .030* |
| Communication | .142 | 2.425 | .016* |
| Transformation | .124 | 3.308 | .002** |
| Exploration | .097 | 1.411 | .050* |
| Exploitation | .149 | 2.541 | .012* |
| Trust | .192 | 3.400 | .001** |
| Social Ties | .212 | 4.229 | .000** |
| $R^2$ | 0.597 | | |
| F | 24.711 | | |
| Sig. | 0.000 | | |

Notes: ** $p<0.01$; * $p<0.05$

### 5.1.9.4 Summary of Hypotheses Testing

Table 5.18 summarizes the results of hypotheses testing. Out of the 24 hypotheses developed, this study has successfully supported 18 of them.

Table 5.18
*Summary of Hypotheses Testing*

| | References | Result (B) | Summary |
|---|---|---|---|
| **H1: There is significant positive relationship between socialization and workplace innovation.** | **Table 5.12** | **.074** | **Not Supported** |
| **H2: There is significant positive relationship between externalization and workplace innovation.** | **Table 5.12** | **.000** | **Not Supported** |
| H3: There is significant positive relationship between combination and workplace innovation. | Table 5.12 | .204** | Supported |
| H4: There is significant positive relationship between internalization and workplace innovation. | Table 5.12 | .124* | Supported |
| **H5: There is significant positive relationship between socialization and organization innovation.** | **Table 5.13** | **.023** | **Not Supported** |
| H6: There is significant positive relationship between externalization and organization innovation. | Table 5.13 | .224** | Supported |
| **H7: There is significant positive relationship between combination and organization innovation.** | **Table 5.13** | **.019** | **Not Supported** |
| H8: There is significant positive relationship between internalization and organization innovation. | Table 5.13 | .263** | Supported |
| **H9: There is significant positive relationship between socialization and social capital.** | **Table 5.14** | **.077** | **Not Supported** |
| **H10: There is significant positive relationship between externalization and social capital.** | **Table 5.14** | **.034** | **Not Supported** |
| H11: There is significant positive relationship between combination and social capital. | Table 5.14 | .189** | Supported |
| H12: There is significant positive relationship between internalization and social capital. | Table 5.14 | .163* | Supported |
| H13: Knowledge communication is positively related with workplace innovation. | Table 5.12 | .094* | Supported |
| H14: Knowledge transformation is significant positively related with workplace innovation. | Table 5.12 | .112* | Supported |
| H15: Knowledge communication is significant positively related with organization innovation. | Table 5.13 | .127* | Supported |
| H16: Knowledge transformation is significant positively related with organization innovation. | Table 5.13 | .104* | Supported |
| H17: Knowledge communication is significant positively related with social capital. | Table 5.14 | .142* | Supported |
| H18: Knowledge transformation is significant positively related with social capital. | Table 5.14 | .124** | Supported |
| H19: Knowledge exploration is positively related with workplace innovation. | Table 5.12 | .114* | Supported |
| H20: Knowledge exploitation is significant positively related with workplace innovation. | Table 5.12 | .184* | Supported |
| H21: Knowledge exploration is significant positively related with organization innovation. | Table 5.13 | .212** | Supported |
| H22: Knowledge exploitation is significant positively related with organization innovation. | Table 5.13 | .150* | Supported |
| H23: Knowledge exploration is significant positively related with social capital. | Table 5.14 | .097* | Supported |
| H24: Knowledge exploitation is significant positively related with social capital. | Table 5.14 | .149* | Supported |

Notes: **p<0.01, *p<0.05

It is observed in the table 5.18 above, socialization dimension under knowledge creation is found to be statistically insignificant to the entire dimension of social innovation i.e. workplace innovation, organization innovation and social capital ($p>0.05$). Furthermore, externalization dimension of knowledge creation also shows no significant effect ($p>0.05$) with the two dimension of social innovation namely; workplace innovation and social capital. As for combination dimension of knowledge creation, it shows not statistically significant towards organization innovation of social innovation ($p>0.05$). Hence, hypothesis of H1, H2, H5, H7, H9 and H10 were not succesfully supported.

Continous from the above paragraph, internalization dimension of knowledge creation is found statistically positive effect on all the three dimension of social innovation i.e. workplace innovation, organization innovation and social capital at ($p<0.01$, $p<0.05$). Combination dimension of knowledge creation also indicates a positive effect on workplace innovation and social capital of social innovation at ($p<0.01$). Knowledge transfer that comprises dimensions of communication and transformation were all significantly predicted workplace innovation, organization innovation and social capital of social innovation at ($p<0.01$, $p<0.05$). Continuously, knowledge application as represented by exploration and exploitation dimension is also found to be statistically significant with all the social innovation dimensions i.e. workplace innovation, organization innovation and social capital, at ($p<0.01$, $p<0.05$). Therefore, hypothesis H3, H4, H6, H8, H11, H12, H13, H14, H15, H16, H17, H18, H19, H20, H21, H22, H23 and H24 were all succesfully accepted. Figure 5.6, 5.7 and 5.8 below illustrated the significant effect of the three regression model developed in this study.

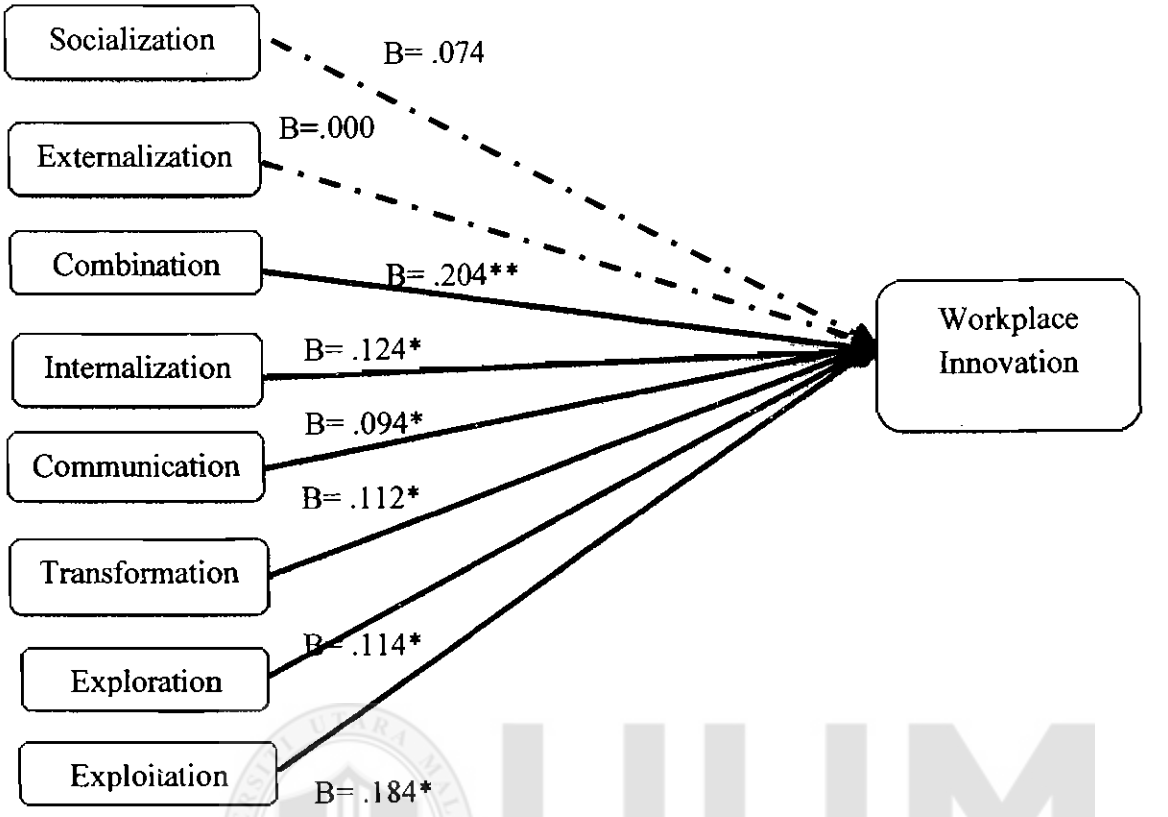



Figure 5.6
*Workplace Innovation: Regression Model 1*



Notes: ⟶ Significant positive relation (**p<0.01, *p<0.05)

- · → No significant relation (p>0.05)

Workplace Innovation = 0.472 + 0.074$Soc_i$ + 0.000$Ext_i$ + 0.204$Comb_i$ + 0.124$Int_i$ + 0.094$Comm_i$ + 0.112$Trans_i$ + 0.114$Explo_i$ + 0.184$Exploit_i$ + 0.265$Lead_i$ + 0.147$Orgstruct_i$ + 0.399$HRM_i$ + $\bar{e}$.

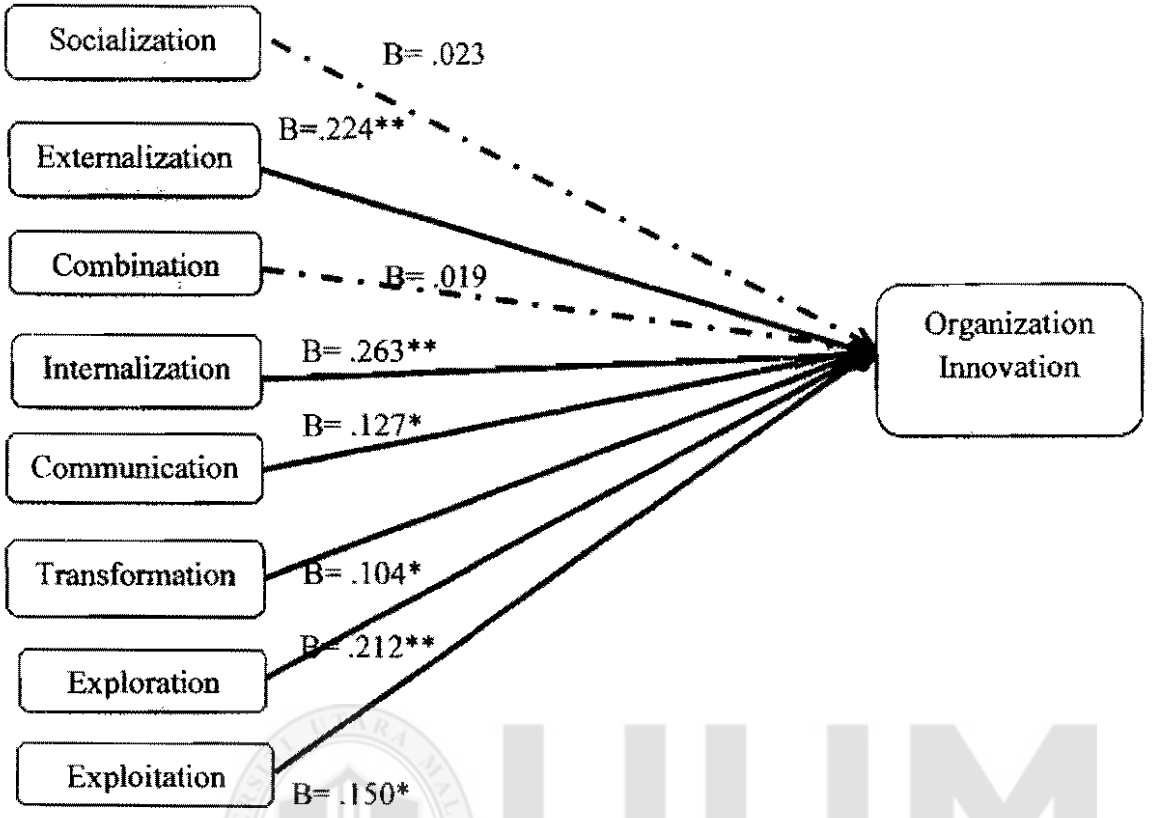



Figure 5.7
*Organization Innovation: Regression Model 2*

Notes: ⟶ Significant positive relation (**p<0.01, *p<0.05)

- · ➤ No significant relation (p>0.05)

Organization Innovation = -0.059 + 0.023$Soc_i$ + 0.224$Ext_i$ + 0.019$Comb_i$ + 0.263$Int_i$ + 0.127$Comm_i$ + 0.104$Trans_i$ + 0.212$Explo_i$ + 0.150$Exploit_i$ + 0.222$Lead_i$ + 0.273$Orgstruct_i$ + 0.201$HRM_i$ + $\bar{e}$

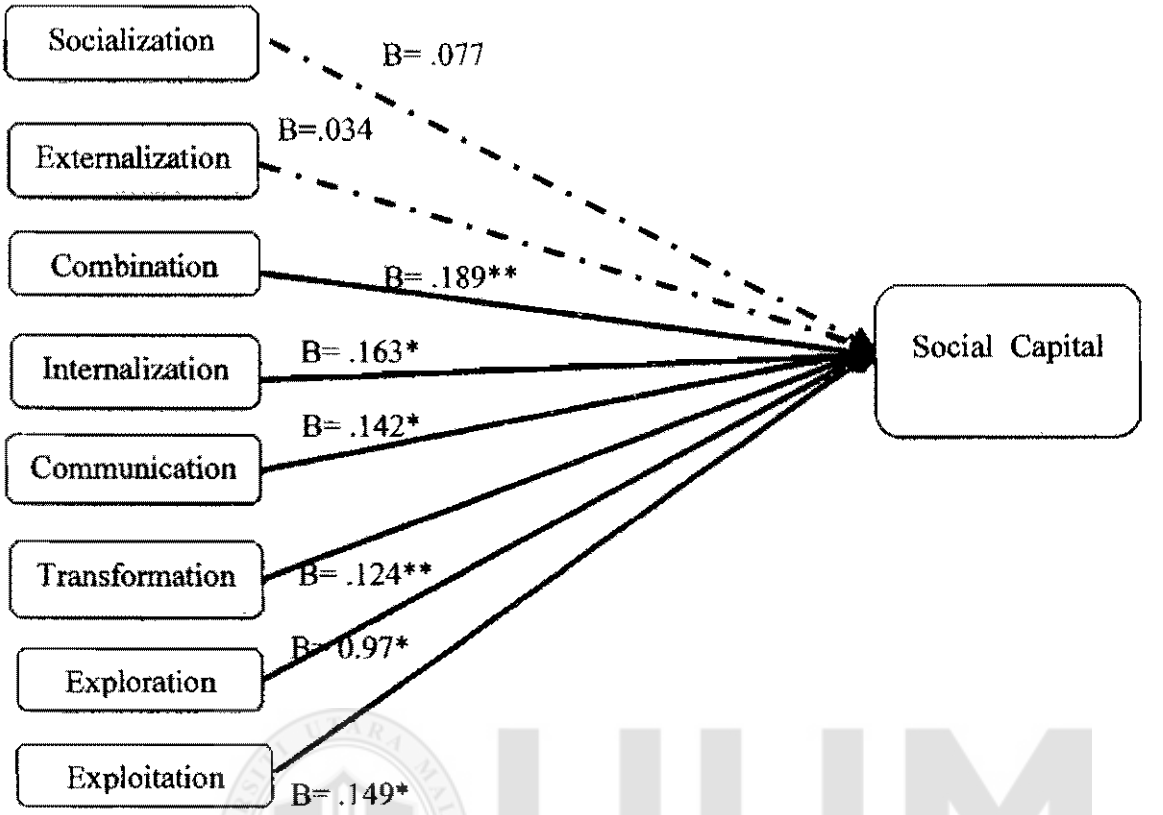



Figure 5.8
*Social Capital: Regression Model 3*



Notes: ⟶ Significant positive relation (**p<0.01, *p<0.05)

- · ➤ No significant relation (p>0.05)

Social Capital = 0.360 + 0.077$Soc_i$ + 0.034$Ext_i$ + 0.189$Comb_i$ + 0.163$Int_i$ + 0.142$Comm_i$ + 0.124$Trans_i$ + 0.097$Explo_i$ + 0.149$Exploit_i$ + 0.192$Trust_i$ + 0.212$Socties_i$ + $\bar{e}$

## 5.2 Analysis and Findings of Qualitative Method (Supporting findings)

This section presents the analysis and findings of qualitative method of inquiry in this study. The qualitative method of inquiry is conducted in order to support and add value to the main findings of quantitative approach in this study. The qualitative method of inquiry provides answer to the two research objectives and questions namely: (4) to explore the level of understanding of association between strategic knowledge management processes and social innovation among actors within Malaysian university-industry-community partnership ecosystem and (5) to identify actor's roles and key factors that can potentially impedes the process of knowledge application within Malaysian university-industry-community partnership ecosystem in achieving social innovation. This section will begin with a brief description as to how the open codes and main themes were generated from the main twelve (12) interview sessions conducted in this study (details process shown in the chapter four under the pilot study of qualitative method of inquiry section). Following that, a summary of the coding and profiles of interviewees will be presented. Next, the analysis of findings of qualitative method of inquiry will then be discussed in narrative form based on the open codes and main themes (most of the open codes and main themes are derived from the two interview sessions conducted in the pilot study of qualitative method of inquiry section). The research objectives and questions will be referred with the open codes and main themes and provide answer for both qualitative research objectives and questions.

### 5.2.1 Brief description of Open Codes and Main Themes Process of the twelve (12) Interview Sessions

The open codes and main themes are derived from the initial process of interview transcription obtained from the voice recording during the twelve (12) interview sessions conducted with the actors in the Malaysian university-industry-community partnership projects of RU1, RU2, RU3, RU4 and RU 5. Furthermore, similar to the validation process in the pilot study of qualitative method of inquiry, all the twelve (12) interview sessions are subject to the same validation process. The open codes derived from the initial interview transcription are then grouped in accordance with the main themes (Saunders et.al., 2007). The main themes generated from the twelve (12) interview sessions were based on the related literature and theory under investigation as per suggested by Strauss and Corbin (1998) and Creswell (2013), and subsequently associated towards answering the qualitative research objectives and questions formulated in this study.

### 5.2.2 Coding and Demographic Profile of Interviewees

Selection of interviewees namely; Academicians (project leaders), industry actors and community actors to participate in the interview sessions is justified based on the fact that they are the main actors and expert's individual that have the information and experience (Kumar et.al., 2013) within the partnership project that can provide various information required in order to answer the supporting qualitative research objectives and questions developed in this study. The interview questions are semi-structured in nature. The semi-structured interview protocol questions allow researcher to leverage in-depth and useful information in more efficient and effective way, and therefore, provide a better understanding and meaning (Creswell et.al., 2003). Furthermore, semi-structured interview protocol questions ensure flexibility, structure and consistency when it comes to the interpretative nature of study (Johannessen & Dolva, 1995).

From the above paragraph, semi-structured interview protocol questions were asked in a logical and meaningful sequence followed by interventions in the form of probes and prompts based on the interviewee's information and hence, depth and richness of information, clarification and description was achieved (Riley, 1996). A total of twelve (12) interview sessions were conducted consisting of twelve (12) main actors i.e. academicians, industry and community; of Malaysian university-industry-community partnership project ecosystem. The coding and demographic profile of interviewees is presented in table 5.19.

Table 5.19
*Coding and Demographic Profile of Interviewees*

| Actor code | Actor category | Partnership project | Interviewees details information |
|---|---|---|---|
| AA1 | Academician | University-Industry partnership (RU1) | Possesses a Ph.D., designated as a senior lecturer. Has 15 years of experience in academic. The area of expertise in the public health insecticide, laboratory management & safety and bioassay of chemical substance. Has been involves in University-industry partnership grant before. |
| AA2 | Academician | University-Industry partnership (RU1) | Possesses a Ph.D., designated as a professor. Has 20 years of experience in academic. The area of expertise in communication and radar system, RF and microwave and superconducting circuit design. He has a vast experience working with industry partnership. |

Table 5.19 (Continued)

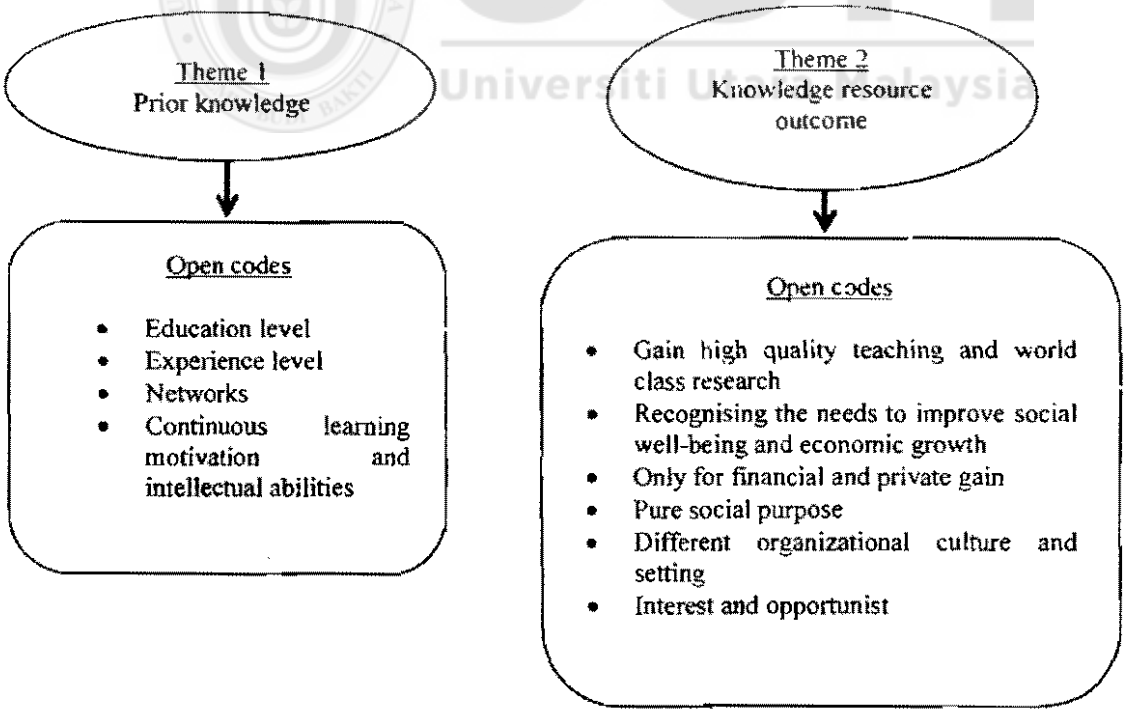
| Actor code | Actor category | Partnership project | Interviewees details information |
|---|---|---|---|
| AA3 | Academician | University-Community partnership (RU1) | Possesses a Ph.D., designated as a professor. Has 25 years of experience in academic. The area of expertise in pharmacology, drug of abuse, tobacco control and prevention in adolescent. At the time of interviewing, he is the director of National Poison Centre. He has a vast experience working with community and industry partnership. |
| AA4 | Academician | University-Community partnership (RU2) | Possesses a Ph.D., designated as a professor. Has 20 years of experience in academic. The area of expertise in economics, business and trade. At the time of interviewing, she is the head of department in the faculty of economics and administration. She involves in various research grant in connection with social community engagement. |
| IA1 | Industry | University-Industry partnership (RU1) | Possesses a degree in integrative medicine focuses in herbs and traditional medicine. He is the owner of the company. Have 20 years of experience in doing business in the area of traditional herbal medicine, health food products, cosmetics and toiletries. |
| IA2 | Industry | University-Industry partnership (RU1) | Possesses a degree in electrical and electronic engineering. He is the owner of the company. Has at least 8 years of experience dealing business in the area of communication and radar system, RF and microwave. He has worked in the past as a production manager before venture into business. |
| IA3 | Industry | University-Industry partnership (RU3) | Possesses a degree in mechanical engineering. He is the owner of the company. Has 7 years of experience dealing business in the area of manufacturing mechanical engineering products. Previously, he has worked in the related industry as a technician and engineer. |

Table 5.19 (Continued)

| Actor code | Actor category | Partnership project | Interviewees details information |
|---|---|---|---|
| IA4 | Industry | University-Industry partnership (RU5) | Possess various certificates and training in structural and material composite for construction. He is running his own business. Have 10 years of experience dealing business in the area of civil engineering particularly in structural and material composite. At the time of interviewing, was in the process of introducing a new material composite product for building materials. |
| CA1 | Community | University-Community partnership (RU1) | Possesses a diploma in teaching. He has been involved in community services and voluntary works for 10 years. At the time of interviewing, he is the chairman of a community association. |
| CA2 | Community | University-Community partnership (RU4) | Possesses Malaysian Certificate of Education (SPM). Has a background in agriculture and entrepreneurship. Have 15 years of experience in doing rice crop management. At the time of interviewing, he is the farmer community leader in the area and has vast experience in doing community works. |
| CA3 | Community | University-Community partnership (RU4) | Possesses Malaysian Certificate of Education (SPM). Has undergone training and short courses for "Aquilaria" tree planting and commercial value. He is the community leader at the area. Have 15 years of experience in community services and voluntary works. |
| CA4 | Community | University-Community partnership (RU3) | A degree holder and possesses various certificates in related area of expertise. He is the chairman of a community cooperative association. Has 10 years of experience doing community works and leading of the cooperative association. |

### 5.2.3 Findings of Open Codes and Main Themes derived from Twelve (12) Interview Sessions

The findings are presented in accordance to the open codes and main themes derived from the twelve (12) interview sessions. It should be noted that similar and repetition of issues, open codes and main themes were highlighted and discussed by the interviewees in the earlier two (2) interview sessions within the validation process of pilot study and in the rest of interview sessions conducted during the main interview sessions has been appropriately summarize, grouped together and taken into account in order to avoid repetition of open codes and main themes. Figure 5.9 and 5.10 below summarised the main themes and open codes emerged from the twelve (12) interview sessions. Figure 5.9 main themes and open codes for research objective and question; (4); to explore the level of understanding of association between strategic knowledge management processes and social innovation among actors within Malaysian university-industry-community partnership ecosystem.



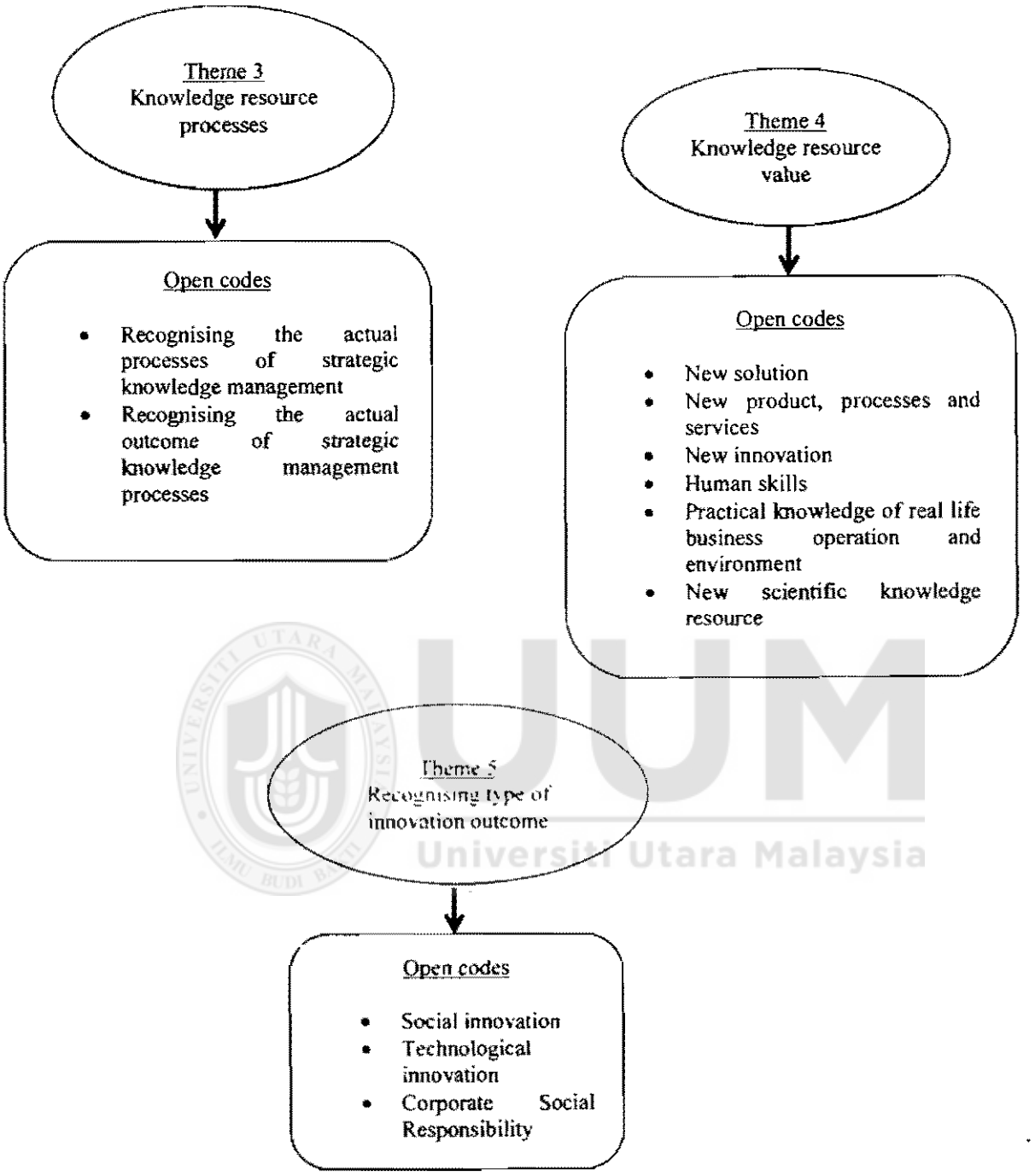



Figure 5.9
*To Explore the Level of Understanding of Association between Strategic Knowledge Management Processes and Social Innovation Among Actors within Malaysian University-Industry-Community Partnership Ecosystem.*

Figure 5.10 Main themes and open codes for research objective and question: (2) to identify actor's roles and key factors that can potentially impede the process of knowledge application within Malaysian university-industry-community partnership ecosystem in achieving social innovation.

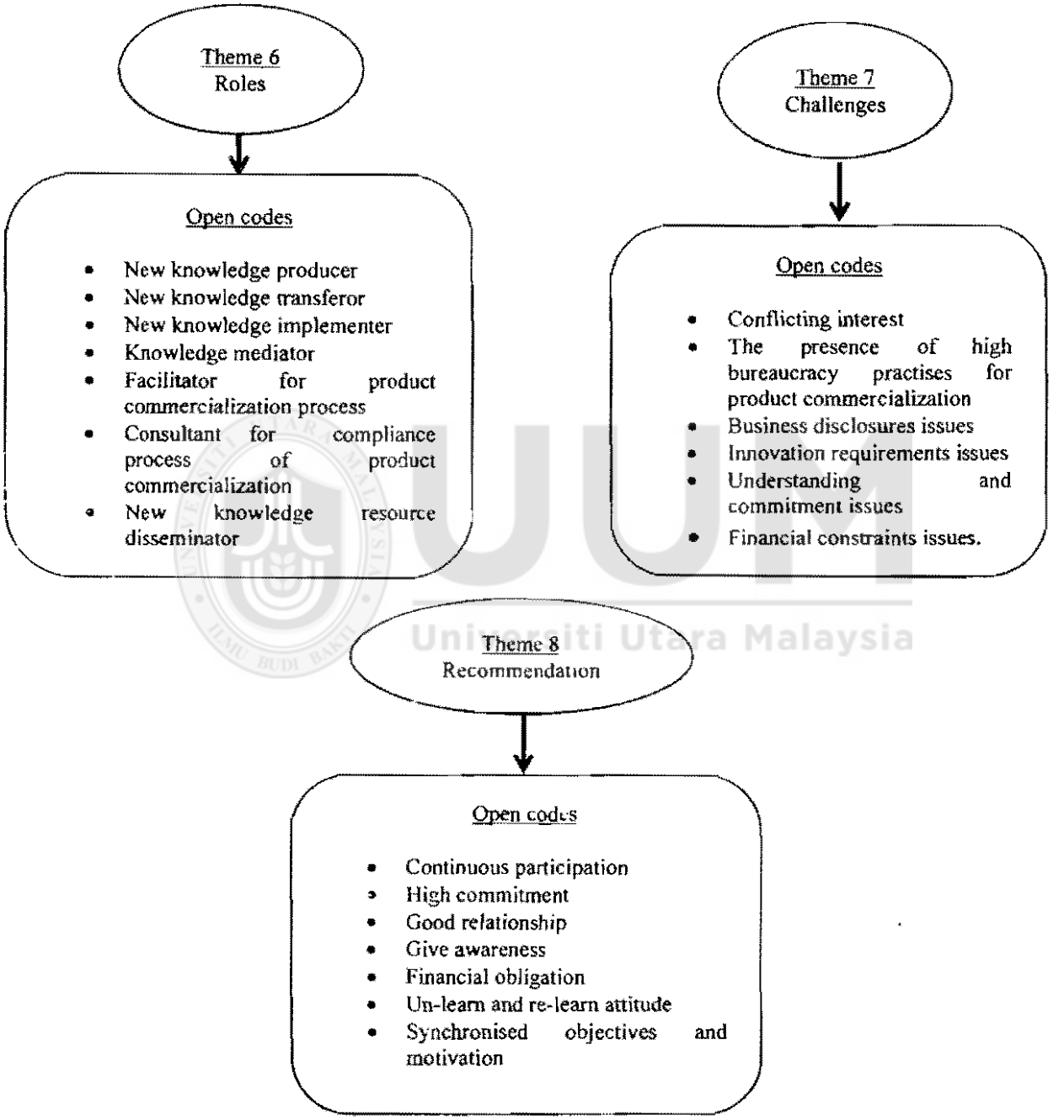



Figure 5.10
*To Identify Actor's Roles and Key Factors that can potentially impede the Process of Knowledge Application within Malaysian University-Industry-Community Partnership Ecosystem in achieving Social Innovation.*

The main themes and open codes of each will be discussed in accordance to the qualitative research objective and question formulated in this study in the following sections. The first section discussed the main themes and open codes to answer the qualitative research objective and question namely; to explore the level of understanding of association between strategic knowledge management processes and social innovation among actors within Malaysian university-industry-community partnership ecosystem.

#### 5.2.3.1 Theme 1: Prior Knowledge

Consistent with the literature surrounding on research understudy, prior knowledge is the starting and focal point to explore the actors' understanding on the association between strategic knowledge management processes and social innovation among actors within Malaysian university-industry-community partnership ecosystem. Prior knowledge refers to the common knowledge resource, accumulation of knowledge resource and acquisition of knowledge resource of a particular issue i.e. current knowledge resource based (Cohen & Levinthal, 1990); which the actors possess that comes from sources namely; education background, experience level, network integration and continuous learning motivation and intellectual abilities (Reagans & McEvily, 2003) in order to help them understand clearly the association of strategic knowledge management processes and social innovation as a new innovation outcome strategies when engaging in Malaysian university-industry-community partnership project.

From the above paragraph, all the twelve (12) interviewees that consist of academic, industry and community actors were asked to briefly introduce themselves and to elaborate their education level, related experience and networks, and expertise and skills in order to recognise their prior knowledge towards understanding the association between strategic

knowledge management processes and social innovation. For interviewee's code AA1, AA2, AA3 and AA4 who represent academic actors, all of them show they have a substantial prior knowledge towards understanding the association between strategic knowledge management processes and social innovation within Malaysian university-industry-community partnership ecosystem. All of the academic actors AA1, AA2, AA3 and AA4possess a PhD, have vast experience and have been successfully recognised by others in their related area, and have an extensive knowledge resource network relation. In particular, AA1 stated that, he has a PhD, he previously worked with industry prior to joining academic position and he also involves in various knowledge resource collaboration in the past, *"I have a Ph.D. and have more than 15 years of experience working with industry and university. I involve in various knowledge resource collaboration in the past, I am in a position to recognise that knowledge resource collaboration benefited all partners in terms of enhancing their performance, knowledge, skills and competency"*. This statement shows that the academic actor has a good understanding on the association and contribution of knowledge resource creates within the strategic knowledge management processes on social innovation through prior knowledge that they possess in the past. Furthermore, academic actor AA2, AA3, AA4 all conclude by stating that, *"Within my past collaboration, I know a lot of people and have been keep in touch with all of them ever since. I have witness that knowledge resource collaboration is the useful avenue that benefited all partners in terms of social, economic and technological.* This uniform understanding shows that prior knowledge of networks relation in the past guide them to understand the association between strategic knowledge management processes and social innovation.

For interviewee's code IA1, IA2, IA3 and IA4 who represent industry actor, all of them possess prior knowledge, however it is very much inclined and focus towards industry aspects

and private benefits. IA1 stated that *"I possess a degree that is related with my business area. I am the owner of the business. I have 20 years of experience in doing business and I know a lot of people. With my business experience and my connections, I have what it takes to commercialise the product created within this partnership that can help my business to prosper more"*. For IA2 he replied by stating *"I possess a degree in electrical and electronic engineering. I have started my own business since 8 years ago, prior to venturing into business; I worked as a production manager in industry. This partnership will help me to introduce a new product line for my business and stay survival"*. Furthermore, when questions were asked to IA3, to explore his level of understanding on the association of strategic knowledge management processes on social innovation through his prior knowledge, he replied by saying *"I possess a degree in mechanical engineering. This is my business and it means very much to me. After 7 years of experience dealing with business that I venture into, my educational background, added with many years of experience working with industry and of course guidance from my past fellow acquaintance that I used to work with, I can say that this partnership definitely increases my company profits and enhances efficiency and effectiveness of my company production"*. For IA4, he mentioned that his prior knowledge upon his involvement in the Malaysian university-industry-community partnership are the possession of various certificate, and he underwent various trainings in his related field. In addition, he is the owner of the business for about 10 years. Prior venturing into business, he worked in the industry that is related with his business. Apart from that, IA4 also had the same opinion with other industry actors that prior networks channel is one of the most important sources of prior knowledge that can give a significant bearing to the commercial benefits leveraged from Malaysian university-industry-community partnership project. He states that *"Apart from my education knowledge, skills and business and work experience, the connection with previous people that I have worked and connect with, give me a valuable*

*indication that this partnership benefits me in terms of commercial returns for my business".* Drawing from the above statements by the industry actors, their prior knowledge of engaging in the Malaysian university-industry-community partnership project is very much focused on gaining private benefits in terms of financial profit, to introduce a new product line and to secure competitive advantage over competitors. Hence, the prior knowledge of industry actors strongly lead them to associate strategic knowledge management processes towards technological innovation rather than social innovation.

For interviewee's code CA1, CA2, CA3 and CA4 who represent community actors, all of them possess prior knowledge, however it is very much inclined, and focuses towards fulfilling social responsibility. To elaborate further, their prior knowledge of having engagement in the Malaysian university-industry-community partnership project is understood and guides them in such a way that the project is just merely as volunteering activities and charitable contributions towards fulfilling the obligation of social responsibility and social connection to the community. As for evident, during the interview session with CA1, he was being asked to briefly introduce himself and to elaborate about his education level, related experience and networks, and his expertise and skills he replied *"I possess a diploma in teaching. I am the community leader in my area. I have 10 years of experience in doing community services and voluntary works in my related expertise. As a community leader, i empowered other community members to participate socially in this partnership project"*. However, when he was being probed further to explore his prior knowledge of understanding the associate of strategic knowledge management processes on social innovation in terms of prior networks connection, he replied *"As far as I remember, my previous engagement in similar partnership with Non-Government Organization and other Non-Profit Organization was to fulfil their corporate social responsibility by helping them to*

*connect with our communities socially*". Furthermore, for CA2, he possesses Malaysian Certificate of Education (SPM). He has a background in agriculture and entrepreneurship and has 15 years of experience in doing rice crop management. At the time of interview, he is the farmer community leader in the area and has vast experience in doing community works. CA2 state that "*With my relevant knowledge, experience, skills and added with the connection with other people that I know and used to work with in the past related to this matter, I am in the position to help and to encourage my community member to engage with this volunteering activities and at the same time give opportunity to the community to have a social integration with academic partners in the aspect of rice crop management*". Other interviewees, namely CA3 and CA4, also have prior knowledge in terms of education and formal training, experience, and prior network connection in terms of community services and voluntary works. However, their prior knowledge guides them to understand that strategic knowledge management processes within Malaysian university-industry-community partnership project is very much associated only to satisfy pure social aspects. CA3 expresses his opinion by stating "*I believed that as a community partner, we only done our part towards fulfilling social responsibility and to have an informal social interaction with academician*". In addition, CA4 who possess a degree states that "*I am the chairman of cooperative association in my community area for 10 years now, by connecting and engaging with somewhat similar partnership in the past, this partnership is the same avenue where our community can get together and to have a sort of social interactions with academicians for social activities*". Thus, the statements above indicate that prior knowledge of community actors is very much associate with strategic knowledge management processes that take place in the Malaysian university-industry-community partnership project with pure social aspect.

#### 5.2.3.2 Theme 2: Knowledge Resource Outcome

Knowledge resource outcome is the second theme derived from the interview data in order to explore the level of understanding of association between strategic knowledge management processes and social innovation among actors within Malaysian university-industry-community partnership ecosystem. All interviewees that comprise academic, industry and community actors were asked on their primary interest on getting involved in the Malaysian university-industry-community partnership project in order to probe their understanding on the outcome of knowledge resource created within the processes of strategic knowledge management that take place in the Malaysian university-industry-community partnership project. All academic actors namely AA1, AA2, AA3 and AA4 describe that their main interest in getting involved in the strategic knowledge management processes within the project is to share and apply new knowledge resource within the processes of creation, transfer, and application with other partners; and at the same time gain high quality teaching, and world class research, and therefore, contribute towards improving social and economic growth. All of them somewhat have a similar interpretation by stating that *"I want to share tacit and explicit knowledge that i have in my area of expertise with other partners, so that I can develop new products and also upgrade and up scaling the current products. At the same time, this is the promising avenue for graduate internship (GI), to have a direct involvement of real world business, which can enhance, add values and improves their knowledge, skills and know-how and can become a highly innovative worker or entrepreneur"*. In addition, AA2 state that *"when I and my partners share and apply new knowledge resource within this partnership project, it is not only benefits me as an academic in terms of long term research grant, but also benefited my partners in terms of developing new highly innovative products that give everyone a win-win situation in a concurrent way"*.

For industry actors of IA1, IA2, IA3 and IA4, they highlighted that their primary motives to get involves in the strategic knowledge management processes within the Malaysian university-industry-community partnership project among others are to gain financial profit, introduce a new product line, maintain control over market, overcome market saturation, and also secure competitive advantage over competitors. The entire industry actors who were interviewed appeared to show their interest and priorities to get involved in the strategic knowledge management processes within the Malaysian university-industry-community partnership project is merely to pursue private benefits. To elaborate further, all of them highlighted that they cannot afford to get involved and contribute their time, money and other resources through a long-term partnership without having a short-term commercial return for their involvement and contribution. One of industry actor stated, *"The reason why I get involved in this partnership is to gained opportunity to create new highly innovative products within my company. By having this, my business can sustain within the market, company profits will increase, and company can become more efficient and effective in terms of production and operation. Besides, my company can gain a substantial amount of market share and have a competitive advantage among our competitors"*.



For community actors that comprise interviewee's code CA1, CA2, CA3 and CA4, they appeared to show their primary interest and understand the outcome of knowledge resource created within the strategic knowledge management within Malaysian university-industry-community partnership project only to fulfil social responsibility. To explain further, the interview data of community actors on knowledge resource outcome theme shows that, the entire community actors highlighted that the partnership project outcome did not include other aspects but merely to satisfy pure social purpose. As a result, their understanding and motivation of getting involved in the partnership projects merely as volunteering activities

and charitable contribution towards fulfilling the obligation of social responsibility and social connection of the community. As for evident, CA1 stated that, *"I participate in order to show my social responsibility towards the partnership program conducted by university for helping to curb and preventing the unhealthy social activities among youth in my area. This partnership program is good, in the sense that it can give awareness to the youth about the social issues in hand through social integration between university lecturer and our community members. We have a very nice time interacts with each other in this volunteering activities"*.

From the above paragraphs, academic, industry and community actors revealed their obvious differences on their primary interest in getting involved in the strategic knowledge management processes within Malaysian university-industry-community partnership project. Academic actors have a comprehensive understanding that strategic knowledge management processes creates knowledge resource that can enhance the actors' social capital, improve the actors' economic growth and also provide technological payoffs in a concurrent way. Industry actors only understand and were interested in the fact that the outcome of knowledge resource is to fulfil their private motives and benefits, while community actors see the knowledge resource outcome of this partnership as a social purpose and activity. This finding suggests that differences in organizational culture and setting norms, standards and values and also interest and opportunist must be synchronised; otherwise, there will be lack of understanding on the association between strategic knowledge management processes and social innovation among actors within Malaysian university-industry-community partnership ecosystem.

#### 5.2.3.3 Theme 3: Knowledge Resource Processes

A review of the literature surrounding knowledge management highlighted the importance of the main processes of strategic knowledge management namely; knowledge creation, knowledge transfer, and knowledge application (Meier, 2011). As this study was to explore the level of understanding among actors involve in the Malaysian university-industry-community partnership project on the association between strategic knowledge management processes and social innovation, it was important that all actors have a clear understanding and indication on the knowledge resource processes that take place in the Malaysian university-industry-community partnership project when trying to achieve social innovation as a new paradigm of innovation outcome strategy. All interviewees were asked to explain and share what they know about strategic knowledge management processes that take place in the Malaysian university-industry-community partnership project. For academic actors that comprise AA1, AA2, AA3 and AA4, it was interesting that all of them can recognised the actual processes i.e. knowledge creation, knowledge transfer and knowledge application and the outcome of strategic knowledge management processes i.e. social innovation. For example AA1 states that *"As far I am concern, we involves in creation, transfer and implements the new knowledge resource developed in our project. We work as a team sharing new knowledge and at the end of the day everybody benefits from it"*. AA2 highlights the same as well, stating *"All members in our project share their knowledge resource with each other. From there, we create new superior knowledge resource, we transfer it and we apply it into actual product so that it can be commercialised and benefits people that used and at the same time our partner can make money out of it"*. For AA3 and AA4, they also agree with the above statements and state that strategic knowledge management processes is about learning, sharing, transfer and application of new knowledge resource created within the partnership. Hence, they further highlight when the new knowledge resource embedded into products and

undergo commercialization stage, everybody is said to gain benefits out of it in terms of improving private gain, enhance social capital and improving social well-being. Based from the above statements of all academic actors, it is suggested that academic actors have recognised and understood the actual processes of strategic knowledge management that took place in the Malaysian university-industry-community partnership project and this leads them to understand that these processes giving concurrent benefits to all actors involves in terms of social, economic and commercialization payoffs.

For industry actors of IA1, IA2, IA3 and IA4, all of them only understand and recognise the process of knowledge transfer and knowledge application as the actual processes that take place in the Malaysian university-industry-community partnership project. None of the industry actors can understand and recognise knowledge creation process even though they were also involved in the knowledge creation process within the partnership project with other actors. All of them understand that the outcome of both processes help them to develop new products in the markets and simultaneously improve their company performance and innovativeness. Hence, this leads towards achieving private benefits and competitive advantage within their companies. Industry actor of IA1 states that *"I received new knowledge resource from academic, they are the "smart people" and we apply the new knowledge resource into product and improve our company performance and innovativeness"*. Furthermore, IA2 states that *"Academic actor transfers their knowledge resource expertise to us, we learned and together we apply the new knowledge resource into our existing products to make them highly innovative. We gained substantial amount of financial profit out of it"*. Consistent with the above interviewees, IA3 and IA4 also highlight that they only involve in receiving the new knowledge resource from academic actors who have the superior knowledge resource expertise as compared to them. Furthermore, IA3 and

IA4 stress that academic actors have wealthy technical and business knowledge-base that are related to their business and can contribute massively towards their companies' sustainable competitive advantage.

All of the community actors who comprise of CA1, CA2, CA3 and CA4understand strategic knowledge management processes i.e. knowledge creation, knowledge transfer, and knowledge application as they were only involved in the process of knowledge transfer. One of the community actors, CA1 states that "*Academia teaches, give instructions and delivers new knowledge resource to our community members. This new knowledge increases our awareness and enhances our social integration with them*". As for CA2, CA3 and CA4, they understand strategic knowledge management processes as social integration between academic and community members in a shared social context, whereby academics transfer their knowledge resource expertise to the community members in the form of volunteering activities and charitable contribution towards fulfilling the obligation of social responsibility and social connection to the community. CA4 states that *"Academia transfers and shares new knowledge resource to our community through social interactions and enhance our understanding on how to improves the effectiveness and efficiency of our community services"*. From the above statements, it can be concluded that community actors understand the strategic knowledge management processes as having only knowledge transfer process within Malaysian university-industry-community partnership project. They also associate knowledge transfer process outcome with volunteering activities and charitable contribution program between academia and community members towards fulfilling social obligation.

#### 5.2.3.4 Theme 4: Knowledge Resource Value

Knowledge resource value is the fourth theme derived from the interview data in order to explore the level of understanding of association between strategic knowledge management processes and social innovation among actors within Malaysian university-industry-community partnership ecosystem. All interviewees that comprise academic, industry and community actors were asked on the output and benefits of strategic knowledge management processes within the Malaysian university-industry-community partnership project. Based on the literature of social innovation within the perspective of knowledge-innovation led economy highlighted that knowledge resource is regarded as the new and novel solution that can be embedded into products, processes and services in order to fulfil social, economic and technological needs and simultaneously improved quality and quantity of people's life (Altuna et.al., 2015). Therefore, it is very much important for all interviewees involve to understanding and recognise what is the output that were leveraged from strategic knowledge management processes within Malaysian university-industry-community partnership project in line with social innovation perspective. These understanding and recognition is one of the indicators in order to explore their level of understanding of association between strategic knowledge management processes and social innovation. All interviewees appeared to understand and confirm that the partnership project has created new knowledge resource and regards this as a "new novel solution" and "new innovation" that can be embedded into products, processes and services. Furthermore, all interviewees also confirm that they have gained a diverse new knowledge resource form other actors within the partnership project. To show example, AA1 representing the academic actors highlight that the new knowledge resource created within the partnership project had contributed towards developing new highly innovative products which offer the market a brand new product. In addition, AA1 also stresses that, specifically the partnership project improves and enhances their skills and know-

how in terms of practical knowledge of real life business operation and environment. As for industry actors, IA1 states that *"I can assure that this partnership helps me in developing new product and now we have a new product line in our business production. I gained new solution and information out from this partnership"*. The statement made by IA1 who represents the industry actor's shows that they understand that the partnership project has developed new scientific knowledge resource as a new novel solution that can be used to develop highly innovative product and subsequently gives a substantial growth in terms of their business performance. CA1 that represents community actors states that *"I can see that this partnership creates new solution in terms of creating a special education module to combat social issue in hand and bring together community from all walks of life to get involve and participate in the social activities and community out-reach programme and at the same time communicate with each other on the community services and social problem in hand"*. The statement highlighted by CA1 suggests that new knowledge resource created within the partnership is regarded as a new solution that is used to fulfil the needs of the community in terms of social responsibility, social integration and social issues.



#### 5.2.3.5 Theme 5: Type of Innovation Outcome

Type of innovation outcome is the last and the most important theme derived from the interview data in order to explore the level of understanding of association between strategic knowledge management processes and social innovation among actors within Malaysian university-industry-community partnership ecosystem. Interestingly, within the present innovation literature, a great deal of empirical research has considered knowledge resource as the basis of new paradigm of innovation outcome strategy i.e. social innovation; (Chiva et.al., 2014; Sanzo-Perez et.al 2015). To elaborate further, superior knowledge resource embedded into products, processes and services provides significant benefits in terms of social,

economic and technological aspect in a concurrent way (Lee & Restrepo, 2015). On the other hand, the increasing public awareness on social, economic, and technological problems has put social innovation as a new paradigm of innovation outcome strategy and its association with strategic knowledge management processes is said to be much greater and portrays significant benefits as compared to technological innovation and corporate social responsibility per se (Kanter, 2013; Pue et al., 2015).

From the above paragraph, all the interviewees were asked on their opinion regarding whether or not that this partnership project has developed new innovation into the products, processes and services and probe further what is this new innovation leads to achieve. For academic actors that comprise of AA1, AA2, AA3 and AA4, all of them agreed that the their partnership project had successfully developed a new highly innovative product and these products lead to enhance new knowledge, skills and expertise, benefit the industry partners in terms of private gains and also community in terms of improving their social well-being. For example, AA1 states that *"I definitely agree, we create a new highly innovative product in the market and in the long run this product provided significant benefits to the graduate intern and let alone to the industry partner in terms of commercial profits and of course for the well-being of the community that consume of our product"*. As for the AA2, he states that *"We successfully develop a new innovative product within our area. our new product enhance and improves safety of the community, and at the same time give our industry partner an upper hand among their competitors. We also create business opportunity to graduate intern to actually commercialise the new product"*. AA3 and AA4 also appear to agree that their partnership project delivers a new highly innovation product and process which simultaneously leads to contribute towards social, economic and technological aspects.

For industry actors comprises IA1, IA2, IA3 and IA4, all of them agreed that their partnership project successfully created a new highly innovative product and added value to their existing products. However, when probed further on what is the new innovation lead to achieve, all of them only highlighted on private benefits and commercial driven profits. As for evidence, IA1 states that *"This new innovative product give a huge advantage to the company business in gaining a substantial amount of market share as compared to other competitors and enhances company sustainability. Besides, this product is one of its kinds in the market today"*. For IA2, he states that *"We developed new product through a new scientific knowledge created by our academic partner, we manage to sell quite a number and this had increase our profits and enhance our business performance"*. The other two industry partners - IA3 and IA4 highlighted that the creation of new highly innovative product with their respective academic partners within the partnership, had improved their business performance in terms of profits, market share, efficient and effective use of resources, competitive advantage and innovation skills. This situation arises due to the nature and arrangement of the projects that emphasize only on solving industries issues and problems. Community actors as represented by CA1, CA2, CA3 and CA4 also agreed that the partnership project has developed new innovative things that can be used for the benefits of their community. However, all the community actors only focus and incline their perception and beliefs towards corporate social responsibility. To elaborate further, they are somewhat not aware and well exposed to the concept and terminology of social innovation as a new paradigm of innovation outcome strategy within their partnership projects. CA1 highlights *"We learned new things from the academic partners and I believed that as a community partner, we only done our part towards social responsibility programme and activities for the community"*. For CA2, he states *"The partnership project create new processes and this new process helps us to ease our agriculture job in an efficient and effective way, however this new process benefited me and*

*my community in the way that we used it for our own and mainly due to fulfil social responsibility and social connection to the community".* CA3 stresses that *"I am happy that the partnership project that I were involves creates new things to my community and benefited my community in terms of having continuous participation in the social activities and programs such as informal group discussion, informal social meeting and gathering and other community out-reach programme with academician".* CA4 highlights that the partnership project outcome does not include private aspects but merely satisfies pure social aspect. As a result, even though the partnership project has created new innovative things, he sees it as merely a volunteering activity and charitable contribution towards fulfilling social responsibility to the community. From the above paragraphs, it can be concluded that all actors confirm that the partnership project that they were involved in had successfully developed new innovations into the products, processes and services but however, they show different kind of understandings on the innovation outcome whereby, only academic actors relate strategic knowledge management processes with social innovation, whereby industry actors relate with technological and commercial driven innovation and community actors relate strategic knowledge management processes with corporate social responsibility and pure social purpose.

The next section discusses the main themes and opens codes in order to answer qualitative research objective and question namely; to identify actor's roles and key factors that can potentially impedes the process of knowledge application within Malaysian university-industry-community partnership ecosystem in achieving social innovation.

### 5.2.3.6 Theme 6: Roles

Within the literature, knowledge application is described as the end process of strategic knowledge management towards achieving social innovation as a new paradigm of innovation outcome strategy (Altuna et.al., 2015). Knowledge application is said as the form of exploration and exploitation of new knowledge resources for the development of successful new highly innovative product, processes and services (Grant & Baden-Fuller 2004). According to Reid et.al., (2001), accumulation of knowledge assets such as patenting and licensing of new products, processes and services are the evidence of successful application of new knowledge resource. Consistent with the literature, the success of knowledge application process helps interviewees to leverage all the benefits that promise within the scope of social innovation outcome (Akbar & Tzokas, 2013). How such new knowledge resource created within the partnership project is embedded into products, processes and services and ultimately creates new highly innovative products, processes and services is significantly vital process (Grant & Baden-Fuller, 2004; Nonaka & Von Krogh, 2009).



From the above paragraph, all interviewees that comprise academic, industry and community actors were asked to explain about their responsibility and their involvement in the strategic knowledge management processes and commercialization activities within the partnership project in order to identify their roles within the process of knowledge application of Malaysian university-industry-community partnership ecosystem in achieving social innovation. For academic actors that compriseAA1, AA2, AA3 and AA4, all of them have a uniform understanding that their main roles within the partnership project specifically within the knowledge application process are; 1) The main producer of new knowledge resource, 2) The main transferor of new knowledge resource, 3) Knowledge resource co-implementer, 4) Knowledge resource mediator within the knowledge network of the partnership project and 5)

Facilitator and consultant towards product commercialization process. One of the academic actor, AA1 states that *"I act as the leader and mediator with other partners. I am the main source and transferor of new knowledge resource to other partners"*. Furthermore, AA1 added that *"I did get involved in every processes right from the formation of this partnership project until the application of new knowledge. Furthermore, i also involve in the commercialization of new product. Now i involved in the preliminary stage of commercializing the new product developed in the partnership project. I assist in product market survey, product specification and testing, quality control checking and also documents submission for product registration with the related relevant authorities"*. The main roles of industry actors that comprise IA1, IA2, IA3 and IA4 within the knowledge application process of Malaysian university-industry-community partnership ecosystem in achieving social innovation are; 1) The main implementer of new knowledge resource, 2) New knowledge receiver and 3) Duties that are related to the commercialization process for example act as a leader, mediator and the main implementer of commercialization processes i.e. exploration and exploitation of knowledge application. As of evidence, IA1 states in details that *"I received and implement the new knowledge resource creates within our project. I share my industry expertise and information with other partners, although I get involved in every processes of strategic knowledge management within our partnership project, as the owner of the business, I act as the front-liner and lead other members when it comes to the commercialization activities whereby it involved entirely industrialised process for example the setting up cost for effective production, preparation of production and engineering process of factory and also documentations process which refers to the bureaucracy approval in regards with complying the requirements from various related authority in connection with products commercialization"*. For community actors that consist of CA1, CA2, CA3 and CA4, they describe their main roles within the knowledge application process of Malaysian

university-industry-community partnership ecosystem in achieving social innovation as only involve; 1) Knowledge receiver, and 2) Knowledge disseminator. CA1 describe *"I am responsible to learn and received the information given by the university professors and also share my view on the community information with them. In the partnership, I only received new information and go back to share with my community members. I believed that as a community partner, we only done our part towards participating in the social programs and activities that are initiated by government in order to makes sure it is success"*. CA2 also highlight their roles in the knowledge application process within the partnership project is to learned, received and to disseminate the new knowledge resource through informal group discussion, informal social meeting and gathering and other community out-reach programme to other community members, so that they can benefited from it.



**5.2.3.7 Theme 7: Challenges**

Literature highlighted that the differences in norms, standards, values, primary mission, environment setting, and rules and regulations are among others the challenges of the university-industry-community partnership of strategic knowledge management processes in order to achieve social innovation outcome (Cajaiba-Santana 2014). Consistent with the literature, all interviewees of academic, industry, and community actors of Malaysian university-industry-community partnership were asked about their opinions on the outcome of commercialization of product, processes and services, and the main challenges that they face with regards to commercializing activities i.e. knowledge application.

Based on the questions above, a number of challenges had been emerged from the interview sessions conducted with all the interviewees within the Malaysian university-industry-community partnership. The main challenges are; 1) Conflicting interest; 2) High bureaucracy

practices; 3) Business disclosures issues; 4) Innovation requirements issues; 5) Understanding and commitment issues and 6) Financial constraints issues. These are the key factors that can potentially impede the process of knowledge application within the Malaysian university-industry-community partnership ecosystem in achieving social innovation outcome.

All interviewees as represented by the academic, industry and community actors who are involved in the interview sessions indicate strong conflicting interest on the outcome of commercializing activities i.e. knowledge application which is similar with the differences highlighted by the literature. As for academic actors, they state that the commercialization process can lead to the introduction of new highly innovative products which simultaneously give benefits to all actors in terms of funding opportunities for future research, creating future research networking, and most importantly, benefit the people well-being and sustainable economic growth and competitive advantage to other actors. Industry actors show interest on the private and commercial benefits of the commercialization process outcome and community actors only focus on pure social benefits of the commercialization process outcome when asked about their opinions on the outcome of commercialization of product, processes and services. All of the interviewees have a uniform understanding about the key factors that can potentially impede the process of knowledge application within the Malaysian university-industry-community partnership ecosystem in achieving social innovation outcome. They highlight high bureaucracy practices, innovation requirements issues, understanding and commitment issues and financial constraints issues to be the cause of concern. For example, one of the academic actors states that *"In my opinion, the preliminary requirements for commercializing the new products created within the partnership project are the main challenges with regards to the commercializing activities. The preliminary requirements that I referred to are the setting up cost for effective production, preparation of*

*engineering processes of factory in commercializing the product, to get an approval in regards with complying the requirements from various related authority in connection with products commercialization"*. IA1 also suggests that *"The difficulty of the supplier to supply with the accurate specifications of items ordered based on the scientific formula created within this project. We are facing regular problems for example items being supplied by the supplier contains manipulative ingredients which are not according to the new innovative specifications given to them"*. A part from that, understanding and commitment issues is also another key factor that can potentially impede the process of knowledge application within the Malaysian university-industry-community partnership ecosystem in achieving social innovation outcome. Academic actors state that *"It's quite a mission to attract interest and to have a full commitment from other actors in relation to the knowledge application of this partnership project. For example time spend, resource contribution, disclosure of existing business strategy and plan, business processes and other related matters that being contribute into the commercialization process. Furthermore, to convince them in terms of the relevancy and the benefits that they might gain after the commercialization process and when they become part of the partnership project without having stressed more on self-interest and private benefits is an uphill battle"*. Furthermore, the rest of them also appear to be concerned with financial constraints issues, whereby they highlight *"Commercialization process involves a lot of money for the new products or processes to be materialised. You name it, all the processes need huge amount of money and with limited financial resources that we have, we have to find other source of financial funds and we definitely fear that we cannot make it until production stage"*. One of the community actors asserts that *"As i said earlier, i do not involved in the commercialization activities within this partnership project and perhaps i do not realized that this project outcome can be commercialized as the objective is mainly due to fulfil social purpose. However, if this project outcome has the potential to be commercialized,*

*factors such as more financial assistance, manpower and infrastructures in regards with the commercialization activities need to be made available".*

In addition, academic actors highlight that business disclosure issues is also one of the key factors that can potentially impede the process of knowledge application within the Malaysian university-industry-community partnership ecosystem in achieving social innovation outcome. They state that there are cases whereby industry actors were reluctant to share their business strategy and plan, business processes and operation, and other important related matters. They state that *"Our industry partner is very selective in giving access on company strategic documents and operations as well as actual production process to me and to the project graduate intern. May be they don't want us to know in details about their operations".* Therefore, all the key factors such as conflicting interest, high bureaucracy practices, business disclosures issues, innovation requirements issues, understanding and commitment issues, and also financial constraints issues must be dealt with and taken into consideration for improvements and synchronization in order to make sure knowledge application process can be successfully implemented within the Malaysian university-industry-community partnership ecosystem in achieving social innovation outcome.



#### 5.2.3.8 Theme 8: Recommendations

It was highlighted by all the interviewees that improvements and added value must be undertaken in order to make sure that the commercialization activities can be fully achieved in regards to the new highly innovative products, processes or services created within the partnership project. They suggest that improvement and add value in terms of synchronization of the objectives, interest and priorities of the actors involves, so that differences in norms, standards and values, and also primary mission and objectives can be overcome. They also

highlighted that continuous process of direct involvement and assistance, i.e. financial and non-financial terms; from all actors is paramount in order to overcome understanding and commitment issues, and also financial constraints issues. Furthermore, giving high awareness, open to un-learn and re-learn attitude, and a very precise understanding to other actors on the benefits and other advantages that they might gain in terms of the commercialization outcome of the partnership project might overcome the business disclosure issues. They also highlighted that government may assist in terms of initiating policies and procedures that may help to overcome the issues of innovation requirement and to ease high bureaucracy practices among related authorities in order to commercialise the partnership products, processes and services.

### 5.3 Summary of the Findings: Quantitative and Qualitative Method (Sequential Explanatory Strategy)

In general, the results of this study have answer the research questions and objectives developed in this study namely: to examine the impacts of strategic knowledge management processes comprises of knowledge creation, knowledge transfer and knowledge application on social innovation and to explore the level of understanding of association between strategic knowledge management processes and social innovation and also to identify actor's roles and the key factors that can potentially impedes the process of knowledge application in the context of Malaysian university-industry-community partnership ecosystem. Overall, the results have shown that strategic knowledge management processes and control variables used in this study gives a significant positive impacts on social innovation and agreed with the previous studies. In summarising, this study conducted analysis and shows findings of demographic background of the respondents, data screening procedures, descriptive analysis, t-test analysis, reliability and validity analysis, factor analysis, assumption of multiple regressions which involves normality test, linearity test, homoscedasticity test, multi-

collinearity test; and hence conducted correlation and hypotheses analysis. In addition, a hybrid approach which refers to the combination of using NVivo 11 software and manual analysis is adopted in order to analyse the information given from the interview sessions of qualitative method of inquiry. This to suit the open codes and main themes and to construe meaningful insights based on experiences and ideas of the interviewees rather than based on the description and preference of the researcher.

The demographics background of the respondents is fairly distributed in accordance with the partnership projects. The data is clean with a low level of bias. Then, descriptive analysis, t-test analysis, reliability and validity analysis and factor analysis was conducted. After that, assumption of multiple regressions is done in order to fulfil the compulsory protocol prior to conduct correlation and hypotheses analysis. As for correlation analysis, overall results have shown that strategic knowledge management processes and control variables have a strong positive relationship with social innovation and it is expected and concurrence with the previous findings. The multiple regression results showed socialization has no significant relationship with all the dimension of social innovation. Furthermore, externalization dimension has no significant relationship with workplace innovation and social capital. Finally, combination dimension has no significant relationship with organization innovation in the context of Malaysia university-industry-community partnership project ecosystem. Hence, the remaining 18 hypothesis of H3, H4, H6, H8, H11, H12, H13, H14, H15, H16, H17, H18, H19, H20, H21, H22, H23 and H24 were all successfully supported and accepted. As for the qualitative findings, it shows that synchronization of missions, objectives, interest and priorities of the actors involves are paramount in order to solved differences in norms, standards and values and also primary missions and objectives. Factors such as high bureaucracy practices, business disclosures issues, innovation requirements issues,

understanding and commitments issues and also financial constraints issues must be taken into consideration for improvements and adding value to the existing policy and procedures of the Malaysian university-industry-community partnership projects. Further discussion and conclusion in the next chapter will elaborate more on the results, contribution and the implication to the theory.

# CHAPTER SIX

# DISCUSSION AND CONCLUSIONS

## 6.0 Introduction

This chapter presents the discussion and conclusion of the study. This chapter begins with a discussion that provides an overall overview of the study. Next, this chapter discusses the quantitative and qualitative research findings of this study that focus and give insights on the implications of both findings towards Malaysia university-industry-community partnership project ecosystem in addressing the research objectives and questions. Furthermore, it presents the contributions of the study which covers contributions to theory, method, and practical. Moreover, this chapter also highlights the limitations of the study. It will then be concluded by presenting the future research ideas and concluding remarks of the study.

## 6.1 Discussion on Overview of the Study

Social innovation has emerged as a new paradigm of innovation outcome strategy that received an overwhelming interest from governments, public and private institutions worldwide (Pue et.al., 2015). This is due to the fact that, the contribution of social innovation is said to be much greater and portrayed significant benefits as compared to technological innovation per se (Altuna et.al., 2015; Benneworth & Cunha, 2015). According to Lizuka (2013), social innovation gives concurrent benefits towards social, economic and technological aspects, whereas technological innovation limitedly contributes to merely fulfilling private needs. Hence, social innovation provides an outstanding solution to all stakeholders concerned in order to help them overcoming the most crucial and long-standing social, economic and technological problems faced by many nations worldwide (Moore et.al., 2012). Apart from that, knowledge resource is regards as a new and novel solution for social

innovation (Howaldt et.al., 2015). Knowledge resource is created through the independent processes of knowledge creation, knowledge transfer, and knowledge application particularly within the university-industry-community partnership (Sanzo-Perez et.al., 2015). Subsequently, the knowledge resource is then embedded into products, processes, and services which in turn make them highly innovative and provides a significant return in terms of better living condition of people's life, environmental condition, education, and human development, as well as an increase in economic growth, and employment opportunity which will contribute towards profit maximization and private needs (Altuna et.al., 2015). In tandem with the above statements, like many various developed countries, Malaysia also has staggered on social innovation as its new innovation outcome strategy through the university-industry-community partnership.

However, various researchers revealed that social innovation as a new innovation outcome strategy is very much under-developed, limited, and inconsistent in terms of empirical evidence offers within the social innovation literature (Cajaiba-Santana, 2014; Krlev, et.al., 2014; Makimattila et.al., 2015). This situation perhaps offers all parties concerned a limited alternative in searching for the best practice references in regards to adopt social innovation as a new innovation outcome strategy. To elaborate further, within the literature, social innovation is very much central and exclusively connected to the social aspects and social purposes and it is distinct from any relatedness with other innovation outcomes; for example, technological driven innovation (Dawson & Daniel, 2010).This situation leaves social innovation isolated within the scope of social and creates under-value and under-investment of social innovation (Pol & Ville, 2009; Altuna et.al., 2015). Social innovation is not necessarily tied up to address specific social purposes but its significant value encompasses wide range of benefits that include social, economic, and technological aspects (Dunphy

et.al., 2007; Unceta et.al., 2016). Furthermore, little research has examined social innovation with strategic knowledge management processes, particularly in the context of the university-industry-community partnership (Benneworth & Cunha 2015). Westley, et.al., (2014) highlighted that there is an urgent need of comprehensive overview and analysis on the empirical evidence of social innovation and strategic knowledge management processes. In addition, a complete and extensive understanding on the insight of how social innovation and strategic knowledge management processes is linked and connected across organizations must be seriously engaged (Battisti, 2012). Hence, social innovation and its association with strategic knowledge management processes i.e. knowledge creation, knowledge transfer, and knowledge application, must be seriously explored, so that it can provide feedbacks and recommendations to all stakeholders and actors involved within Malaysia university-industry-community partnership ecosystem given the massive contribution that it might afford towards many nations' core aspirations.

This study examines and explores the impact of strategic knowledge management processes on social innovation in the context of Malaysian university-industry-community partnership project ecosystems.

## 6.2 Addressing the Research Objectives and Questions

This section will address the quantitative and qualitative research objectives and questions developed in this study. There are five (5) research objectives and questions which comprise three (3) quantitative research questions and objectives and two (2) qualitative research questions and objectives. The quantitative research questions and objectives are the main findings of this study while qualitative research findings give support and add value to the findings in the quantitative methods. The three (3) quantitative research questions and

objectives namely: 1) To examine the relationship of knowledge creation process with social innovation within the context of Malaysian university-industry-community partnership ecosystem; 2) To examine the relationship of knowledge transfer process with social innovation within the context of Malaysian university-industry-community partnership ecosystem; and 3) To examine the relationship of knowledge application process with social innovation within the context of Malaysian university-industry-community partnership ecosystem and the two qualitative research questions and objectives are: 4) To explore the level of understanding of association between strategic knowledge management processes and social innovation among actors within Malaysian university-industry-community partnership ecosystem; and 5) To identify actors' roles and the key factors that can potentially impede the process of knowledge application within Malaysian university-industry-community partnership ecosystem in achieving social innovation. The next section will discuss in details both research questions and objectives on findings implications.

### 6.2.1 The Quantitative Research Objectives and Questions

This sub-section starts by showing the summarised results of relationship of knowledge creation process with social innovation, followed by knowledge transfer with social innovation and knowledge application with social innovation within the context of Malaysian university-industry-community partnership ecosystem.

#### 6.2.1.1 To Examine the Relationship of Knowledge Creation Process with Social Innovation within the Context of Malaysian University-Industry-Community Partnership Ecosystem

In relation to the first research question and objective above, knowledge creation process acts as the first independent variable of the study as represented by the dimensions of socialization, externalization, combination, and internalization, whereas the dependent variables of social innovation were represented by workplace innovation, organization

innovation, and social capital. The empirical findings of this study is based on the actual sample size of 218 respondents which denotes the partnership projects of Malaysia university-industry-community partnership. As many as twelve (12) hypothesis were developed in this study in order to examine the relationship of knowledge creation process with social innovation within the context of Malaysian university-industry-community partnership ecosystem. Therefore, the following sub-section will start with the discussion of the dimension of socialization, followed by externalization, combination, and finally internalization with their social innovation dimensions.

#### 6.2.1.1.1 Socialization and Social Innovation i.e. Workplace Innovation, Organization Innovation and Social Capital

The first hypothesis ($H_1$) developed for this study stated that there is a significant positive relationship between socialization and workplace innovation. The results of the hypothesis testing analysis shows no support for this hypothesis. Moreover, the second hypothesis within the socialization dimension of knowledge creation process ($H_5$) developed in this study stated that there is a significant positive relationship between socialization and organization innovation. The results of hypothesis testing analysis of this study also do not provide support for this hypothesis. The third hypothesis involving the socialization dimension of knowledge creation developed in this study were ($H_9$) which stated that there is a significant positive relationship between socialization and social capital. The results of hypothesis testing analysis continuously provide no support for this hypothesis.



The socialization dimension under knowledge creation process is developed in order to measure the integration and leveraging of tacit knowledge resource from one person to another through the conversion process of tacit knowledge resource. New tacit knowledge resource can be achieved through socialization activities which involve individuals shared

experience and hands-on experience, informal social meeting, informal joint activities and interactions, mentoring, observations and imitations (Nonaka et. al., 2001; Phelps et.al., 2012). Polanyi (1967) described tacit knowledge resource as something "we know more than we can tell". The statement indicates that tacit knowledge resource is complex in nature. It is multidimensional, highly personal, hard to formalize and will be transferred and disseminated in different ways to different people by means of social relationships (Pun & Nathai-Balkissoon, 2011). In line with the previous statements, Nonaka, (1994) highlighted that tacit knowledge resource is a social interaction whereby social networks interaction has a higher tacit knowledge resource (Kaymaz & Eryigit, 2011). Moreover, tacit knowledge resource cannot be expressed in words, sentences, numbers or formulas. It includes cognitive skills such as beliefs, images, intuitions, and mental models as well as technical skills such as craft and knowhow. Interestingly, Lubit, (2001) and Abdul Jalal et.al., (2013) suggest that tacit knowledge resource is an inimitable competitive advantage and the most valuable knowledge resource of an organization and must be turned into core organizational competence.



Within the literature, socialization dimension within knowledge creation process refers to the process of social integration in order to leverage of tacit knowledge resource from one person to another (Nonaka & Toyama, 2007). This can be achieved through social interaction activities; among others individuals shared experience and hands-on experience, informal social meeting, informal joint activities and interactions, mentoring, observations, and imitations which is a crucial process in order to develop a superior knowledge resource and capabilities that can provide organization with a new novel solution and idea that can be embedded into products, processes, and services in order to achieve inimitable competitive advantage and consequently contribute towards social, economic, and technological benefits (Kanter, 2000). For example, various previous studies among others by Andreeva and

Ikhilchik (2011), Esterhuizen et.al., (2012) and Bolisani and Scarso, (2014) highlighted that socialization dimension are positively related with social innovation in the sense that the process involves direct social interaction and integration activities that possess a different valuable and dynamic tacit knowledge resource. In addition, these direct social interactions and integration activities provide huge contribution to other individual to leverage new tacit knowledge that is embedded within the social relationship. Accordingly, the new valuable, rareness, inimitable, and no substitute of tacit knowledge resource developed in the socialization dimension of knowledge creation provides new novel solution i.e. new superior knowledge; that can be incorporated into products, processes, and services and subsequently contribute towards improving the quantity and quality of people's life, enhance economic growth, and improve technological advances. Moreover, according to Nonaka & Takeuchi, (1995), many Japanese companies, among others Honda, Canon, and Matsushita had successfully created highly innovative products, processes and services through exchanging of new tacit knowledge resource through socialization process of knowledge creation with other organizations. The new tacit knowledge resource created are then applied to create new solutions towards developing superior products, processes, and services that can be offered to the wider society and proven to be significant in providing social, economic and technological benefits to all stakeholder concerned (Nonaka et.al., 2000).

As for the results of hypothesis testing analysis of socialization dimension and social innovation; i.e. workplace innovation, organization innovation, and social capital; in the context of Malaysian university-industry-community partnership project ecosystem, the result shows no support of socialization dimension with all the dimension of social innovation in the context of Malaysia university-industry-community partnership project ecosystem. This results indicates that socialization dimension that involves the creation of new tacit

knowledge resource through individuals shared experience and hands-on experience, informal social meeting, informal joint activities and interactions, mentoring, observations and imitations is not happening in Malaysia ecosystem. This somewhat shows an indication of contradict findings and is not consistent as per described and suggested by the literature and past studies discussed above. Continuously, based on the mean score of social dimension, the results also revealed that all actors involved in the Malaysia university-industry-community partnership project lack of spending a lot of time interacting through informal meetings and social activities in order to discuss and exchange ideas, experience, and opinions. They also have limited activities of sharing experience, observation, imitation, and mentoring activities among them. Furthermore, the mean score also indicates that they lacked of encouragement and motivation in guiding other project actors to have a formal and informal joint activities; for example open dialogue, spending time together to share experience, and they feel that the environment within the project takes place is in a low level of trust, low level in interpersonal relationship and openness, and also high level of cultural and language differences. In addition, project leader also lack of giving continuous encouragement, motivates, and guides other project actors to have formal and informal joint activities.

#### 6.2.1.1.2 Externalization and Social Innovation i.e. Workplace Innovation, Organization Innovation and Social Capital

Externalization is the second dimension of knowledge creation process developed in this study. The hypothesis developed in externalization dimension ($H_2$) stated that there is a significant positive relationship between externalization and workplace innovation. The results of the hypothesis testing analysis shows no support for this hypothesis. Furthermore, the second hypothesis within the externalization dimension of knowledge creation process ($H_6$) developed in this study stated that there is a significant positive relationship between externalization and organization innovation. The results of hypothesis testing analysis of this

study provides support for this hypothesis. The third hypothesis involving the externalization dimension of knowledge creation developed in this study were ($H_{10}$) which stated that there is a significant positive relationship between externalization and social capital. The results of hypothesis testing analysis provides no support for this hypothesis.

In the literature, externalization dimension refers to conversion of tacit knowledge to explicit knowledge. Within this dimension, new knowledge resource is created through formalising the tacit knowledge resource such as experience, intuition, and self-values i.e. craft and know-how (Chatti et.al., 2007) into comprehensive forms that can be understood by others (Nonaka & Konno, 1998). According to Nonaka et.al., (2000) when tacit knowledge is being converted to explicit knowledge by formalizing it through documentations, manuals and database, the new knowledge resource is said to be crystallised. Furthermore, example of new knowledge creation of externalization mode is the concept of new product development and quality control (Nonaka et.al., 2000). Within the externalization dimension, high degree of commitment from individuals is needed where it involves open dialogue, analogies, and models (Andreeva & Ikhilchik, 2011). Consistent with the literature, past studies also provide support that externalization dimension was found to aid the creation of superior knowledge resource within knowledge creation process by converting tacit knowledge resource to explicit knowledge which in turn provides organization with core competence and competitive advantage. Studies by Gourlay, (2003), Lettice and Parekh, (2010) and Easa and Fincham, (2012), found that open dialogue and community of practice among actors on translating tacit knowledge resource among actors into organization explicit knowledge in terms of manual documents, diagrams, and prototypes model had created a new solution for organization that leads to unique competitive advantage and subsequently enhance social innovation in terms of social well-being, economic growth and technological advances.

Furthermore, Khuzaimah and Hassan (2012) also stressed that externalization dimension requires high integration of efforts through open dialogue and community of practice among actors in order to translate, structure, and record new tacit knowledge resource into explicit knowledge of an organization. From the aforementioned activities of externalization dimension, Chatti et.al., (2007) and Miller, (2012) agreed that this can lead to improved actors quality and quantity of working life by promoting active engagement among them, increasing organization competency and innovativeness in creating valuable and inimitable of new knowledge resource that can be embedded into technological advances of products, processes, and services and enhancing social capital among actors involved.

As for the results of hypothesis testing analysis of externalization dimension and social innovation i.e. workplace innovation, organization innovation and social capital; in the context of Malaysian university-industry-community partnership project ecosystem, the result shows that there is no significant relationship of externalization dimension with two (2) dimensions of social innovation; namely, workplace innovation and social capital. However, there is a significant relationship of externalization dimension with organization innovation in the context of Malaysia university-industry-community partnership project ecosystem. This result indicates that the practices of open dialogue and community of practice among actors within the Malaysia university-industry-community partnership project ecosystem is still lacking behind in order to convert tacit knowledge resource of individuals into comprehensive formal documentations, manuals and database of an organization that can be easily understood by others. This shows that activities of spending time together to communicate and share experience, share expertise and know-how and engaging together in informal discussion to help each other resolve problems (Kakabadse et.al., 2003) by contributing resources; for example time, efforts, and financial obligation in translating tacit knowledge

resource into a meaningful explicit form of new superior knowledge resource is somewhat less visible and found to be no strong impact towards social innovation i.e. workplace innovation, organization innovation; within the Malaysian university-industry-community partnership ecosystems which is inconsistent and contradict with the literature and past studies. As for externalization dimension and organization innovation, the result shows positive relationship. This indicates the actors in Malaysian university-industry-community partnership ecosystems practises of converting tacit to explicit knowledge through decentralised decision making, flexible job responsibilities and always implementing new administrative system. From the above discussion, corrective measures and actions must be undertaken as identified above in order to make improvement and add value towards the activities of Malaysia university-industry-community partnership project ecosystem so that the partnership projects meet the aspiration of the government and the people of Malaysia that wanted to see Malaysia becoming a developed country by the year 2020.

#### 6.2.1.1.3 Combination and Social Innovation i.e. Workplace Innovation, Organization Innovation and Social Capital

Combination is the third dimension of knowledge creation process developed in this study. The hypothesis developed in combination dimension ($H_3$) stated that there is a significant positive relationship between combination and workplace innovation. The results of the hypothesis testing analysis provide support for this hypothesis. Next, the second hypothesis within the combination dimension of knowledge creation process ($H_7$) stated that there is a significant positive relationship between combination and organization innovation. The results of the hypothesis testing analysis shows no support for this hypothesis. The third hypothesis involving the combination dimension of knowledge creation developed in this study were ($H_{11}$) stated that there is a significant positive relationship between combination

and social capital. The result of hypothesis testing analysis shows a significant relationship for this hypothesis.

Combination dimension of knowledge creation refers to conversion of explicit knowledge resource to explicit knowledge resource. This dimension involves the process of converting new explicit knowledge resource from other organization and combining with the existing explicit knowledge resource within the organization (Arif et.al., 2009). According to Nonaka et.al., (2000) new explicit knowledge resource is collected from within and outside the organization and then combined, edited and process to form a new superior explicit knowledge resource and then used widely in the organization. The newly created explicit knowledge resource under combination dimension can be stored and accessed (Chatti et.al., 2007) through the help of Information Communication Technology (ICT). According to Panahi et.al., (2012), ICT is an essential mode in the combination dimension in order to ease the process of creating the new superior explicit knowledge resource that provides organization with a new solution in developing highly innovative products, processes, and services and allows continuous offer to society with better products, processes, and services and contributes towards social prosperity, economic growth, and enhance technological benefits (Chatti et.al., 2007). Moreover, previous studies by Nonaka and Von Krogh, (2007) and Bratianu and Orzea, (2010) found evidence that combination dimension enhances organization innovation capabilities by promoting the use of ICT, database and other systematic documents. This in turn provides organization with valuable new explicit knowledge resource that can be used as a new solution towards creating a highly innovative products, processes, and services that can give significant benefits towards social, economic, and technological aspects in a concurrent way.

The results of hypothesis testing analysis of combination dimension and social innovation; i.e. workplace innovation, organization innovation, and social capital; in the context of Malaysian university-industry-community partnership project ecosystem revealed that combination dimension has a strong positive relationship with two (2) of social innovation dimensions; namely workplace innovation and social capital. However, combination dimension does not have a significant relationship with organization innovation dimension of social innovation. The results indicates somewhat a consistent findings with literature and past studies about the importance of ICT within the combination dimension of knowledge creation in order to convert explicit knowledge resource into a new superior explicit knowledge resource that can be used as a new solution towards creating highly innovative products, processes, and services that can give significant benefits towards social, economic, and technological aspects in a concurrent way. Furthermore, most of the actors within the Malaysian university-industry-community partnership project ecosystem understands and acknowledges the importance of having a positive attitude towards ICT application and agrees that within their project they are equipped with good ICT facilities that allow actors to access other related facilities. They also acknowledge that they frequently use ICT facilities in order to communicate and disseminate new explicit knowledge resource to other actors within the partnership project.

In contrast, the results also revealed that most of the actors in the Malaysian university-industry-community partnership project ecosystem are untrained in using ICT facilities in order to reconfigure, diffuse and systemize new explicit knowledge resource that is leveraged from other actors within the partnership project. This situation perhaps may become a barrier in order to have an effective and efficient process within the combination dimension of knowledge creation and might affect the creation of new superior explicit knowledge resource

within the partnership project. Hence, an emphasis must be given to all actors that involve in the Malaysian university-industry-community partnership project in terms of good literacy in using ICT facilities so that they become experts and well-trained in order to reconfigure, diffuse, and systemize new explicit knowledge resource that is leveraged from other actors within the partnership project.

#### 6.2.1.1.4 Internalization and Social Innovation i.e. Workplace Innovation, Organization Innovation and Social Capital

Internalization is the fourth dimension of knowledge creation process developed in this study. The first hypothesis developed in internalization dimension ($H_4$) stated that there is a significant positive relationship between internalization and workplace innovation. The results of the hypothesis testing analysis shows a positive significant relationship for this hypothesis. Furthermore, the second hypothesis within the internalization dimension of knowledge creation process ($H_8$) developed in this study stated that there is a significant positive relationship between internalization and organization innovation. The result of hypothesis testing analysis of this study provides support for this hypothesis. The third hypothesis involving the internalization dimension of knowledge creation developed in this study were ($H_{12}$) which stated that there is a significant positive relationship between internalization and social capital. The results of hypothesis testing analysis also provide support for this hypothesis.



Within the literature, internalization dimension is described as the process of conversion of explicit knowledge resource to tacit knowledge resource. Explicit knowledge resource can be transferred into tacit knowledge resource into individual and organization through learning by doing i.e. translating theory into practice (Nonaka et.al., 2000; Miller, 2012). From the previous statements, internalization dimension emphasises on practical activities for example

on job training programmes, experiments, simulations, job rotation, training, learning by doing, and sharing of documents such as organization manuals and jobs description in order to allow individual to internalised and increase its tacit knowledge resource in the form of mental model and technical know-how and become a new superior knowledge resources and assets (Andreeva & Ikhilchik, 2011) that can be used and applied by organization to produce highly innovative products, processes, and services with the aim to achieve the outcome of social innovation i.e. contributes towards social, economic, and technological aspects in a concurrent way (Lee & Restrepo, 2015).

Previous studies among others by Coff et.al., (2006) Perkmann et.al., (2011), Phelps et.al., (2012) had shown that various multi-national corporation among others Napp Pharmaceuticals, Siemens, Rolls Royce, and Microsoft encourage their employees to engage in practical activities i.e. job training programmes, experiments, simulations, job rotation, training, learning by doing; with individuals within and outside organization in order to convert different explicit knowledge resource into a new superior tacit knowledge resource of their employees and organization. This mechanism is proven effective and very successful for them in creating new superior knowledge resource that can be embedded into their products, processes, and services and in turn provide them with significant return in terms of social, economic, and technological payoffs. Specifically in terms of providing better living condition of people's life, environmental condition, education, human development, as well as an increase in economic growth, employment opportunity and also contribute towards profit maximization and private needs (Altuna et al., 2015).

The results of hypothesis testing analysis of internalization dimension and social innovation i.e. workplace innovation, organization innovation and social capital; in the context of

Malaysian university-industry-community partnership project ecosystem revealed that internalization dimension have a positive relationship with all the three (3) dimension of social innovation namely workplace innovation, organization innovation and social capital. This indicates a consistent findings with literature and past studies about the significant impact of practical activities such as learning by doing, experimenting, training and simulation within the internalization dimension of knowledge creation in order to convert explicit knowledge resource into a new superior tacit knowledge resource of an individual and organization that can be used as a new solution towards creating a highly innovative products, processes and services that can give a significant benefits towards social, economic and technological aspects in a concurrent way. Moreover, the results of hypothesis testing within Malaysian university-industry-community partnership project also indicate that all actors possess a different and distinctive type of explicit knowledge resource that they bring with them into the partnership project. They acknowledge practical activities is a culture within their project duration by practising learning by doing, experimenting, training and simulation with other actors and proven to have a strong impact in helping them to convert explicit knowledge resource into a new superior tacit knowledge resource. This simultaneously act as a new and novel solution into products, processes and services that work to meet pressing social, economic and technological needs and to improve quantity and quality of people's life (Kanter, 2013).

Interestingly, it was also found that actors in the Malaysian university-industry-community partnership project ecosystem are somewhat incompetent in terms of presenting their explicit knowledge resource into comprehensive and well-structured documents. By doing this, it can help other actors in the partnership project to be able to understand, absorb and applied new knowledge and becoming their core distinctive capabilities in the form of new superior tacit

knowledge resource that can enhance innovation capabilities, social value and social capital. According to King (2009), a formal and systematic form of written and electronic modes of explicit knowledge resource is essential in order to ease the transmition process from one party to another. Moreover, Hoetker and Agarwal (2007) and Miller, (2012) stressed that by having a good and well-structured words, formulas, documents and database of explicit knowledge resource, others can easily leverage it in the form of new tacit knowledge resource through practical activities and this in turn provide a strong significant impacts in terms of enhancing dynamic capabilities of an individual and organization which leads to a creation of highly innovative products, processes and services that contributes to a better living condition of people's life, better environmental condition, better education, better human development, increase in economic growth, increase employment opportunity and also contributes towards profit maximization and private needs (Unceta et. al., 2016). Hence, some corrective measures must be taken in order to make sure that explicit knowledge resource of actors involved in the Malaysian university-industry-community partnership project ecosystem are comprehensive and in a well-structured manner so that it can provide benefits of new tacit knowledge resource to other actors and organization within the partnership and makes them becoming a more highly innovative and dynamically capable. Table 6.0 below summarise the hypothesis testing analysis results of knowledge creation and social innovation that represents the first objective and question of this study.

Table 6.0

*Research Objective 1, Research Question 1 and Summary Results of Knowledge Creation and Social Innovation*

| **Research Objective 1** | **Research Questions 1** | **Dependent Variables: Social Innovation** | **Independent Variables: Knowledge Creation** | | **Test of Hypothesis** | | |
|---|---|---|---|---|---|---|---|
| To examine the relationship of knowledge creation process with social innovation within the context of Malaysian university-industry-community partnership ecosystem | To what extend knowledge creation process significantly influences social innovation within the context of Malaysian university-industry-community partnership ecosystem? | Workplace Innovation; Organization Innovation; Social Capital | **Socialization** | **H1** | **B=.074** | **p>0.05** | **Not Supported** |
| | | | **Externalization** | **H2** | **B=.000** | **p>0.05** | **Not Supported** |
| | | | Combination | H3 | B=.204 | p<0.01** | Supported |
| | | | Internalization | H4 | B=.124 | p<0.05* | Supported |
| | | | **Socialization** | **H5** | **B=.023** | **p>0.05** | **Not Supported** |
| | | | Externalization | H6 | B=.224 | p<0.01** | Supported |
| | | | **Combination** | **H7** | **B=.019** | **p>0.05** | **Not Supported** |
| | | | Internalization | H8 | B=.263 | p<0.01** | Supported |
| | | | **Socialization** | **H9** | **B=0.77** | **p>0.05** | **Not Supported** |
| | | | **Externalization** | **H10** | **B=0.34** | **p>0.05** | **Not Supported** |
| | | | Combination | H11 | B=.189 | p<0.01** | Supported |
| | | | Internalization | H12 | B=.163 | p<0.05* | Supported |

Notes: ** p<0.01, *p<0.05

#### 6.2.1.2 To Examine the Relationship of Knowledge Transfer Process with Social Innovation within the Context of Malaysian University-Industry-Community Partnership Ecosystem

In relation to the second research objective and question above, knowledge transfer process act as the second independent variable of the study represents by the dimensions of communication and transformation, whereas dependent variable of social innovation were represents by workplace innovation, organization innovation and social capital. The empirical findings of this study is based on the actual sample size of 218 respondents which represents the partnership projects of Malaysia university-industry-community partnership. As many as six (6) hypothesis developed in this study comprises of three (3) hypothesis testing in communication dimension and three (3) hypothesis testing in transformation dimension in order to examine the relationship of knowledge transfer process with social innovation within the context of Malaysian university-industry-community partnership ecosystem. Therefore, the following sub-section will start with the discussion on the dimension of communication and followed by transformation dimension with their social innovation dimensions.



##### 6.2.1.2.1 Communication and Social Innovation i.e. Workplace Innovation, Organization Innovation and Social Capital

Communication is the first dimension of knowledge transfer process developed in this study. The first hypothesis developed in the communication dimension ($H_{13}$) stated that knowledge communication is positively related with workplace innovation. The results of the hypothesis testing analysis shows a positive significant relationship for this hypothesis. Furthermore, the second hypothesis within the communication dimension of knowledge transfer process ($H_{15}$) developed in this study stated that knowledge communication is significant positively related with organization innovation. The results of hypothesis testing analysis of this study provide support for the hypothesis. The third hypothesis involving the communication dimension of knowledge transfer developed in this study were ($H_{17}$) which stated that knowledge

communication is significant positively related with social capital. The results of hypothesis testing analysis also provide support for this hypothesis.

The communication dimension under knowledge transfer is describe as the action or process of transporting and also as a conveyance of new knowledge resource from sender to receiver (Argote & Ingram, 2000; Liyanage et.al., 2009). To elaborate further, Szulanski et.al., (2004) defined knowledge transfer as the communication or transmission process of a message from a source to the recipient whereby this process generates new knowledge resource within parties involves. Knowledge communication can be in the form of verbal and written where individual and networks individual communicate with each other through face to face communication, observation and cognitive learning to transport and convey tacit and explicit knowledge resource which involve communication process at individual, group, department and also external organization level (Gilbert & Cordey-Hayes, 1996; Argote & Ingram, 2000). Meier, (2011) highlighted knowledge communication between individual is a vital and significant process in creating a new valuable, rareness, inimitable and no substitute of knowledge resource. Moreover, Kumar and Ganesh, (2009) suggested that all parties involves in knowledge communication must be competence and capable in terms of having the ability to express idea clearly, having a good command in language, have the ability to listen carefully, be attentive and respond quickly. Furthermore, Liyanage et.al., (2009) stated that communication dimension is one of the most important mechanism in obtaining the superior knowledge resource from sender to receiver within the knowledge transfer process (Liyanage et.al., 2009). Furthermore, studies by Bramwell et.al., (2012), Rossi (2014) and Benneworth and Cunha (2015) show that effective communication of knowledge transfer within and across organization borders have a positive effect on social innovation. To elaborate further, their studies revealed that a sound communication between sender and receiver creates a new

superior knowledge resource that are valuable, rareness, inimitable and no substitute. Thus, this new knowledge resource is embedded into organization products, processes and services to make them highly innovative and subsequently contributes not only towards technological but also towards social and economic benefits (Lichtenthaler & Lichtenthaler, 2009; Chiva et.al., 2014).

The results of hypothesis testing analysis of communication dimension and social innovation i.e. workplace innovation, organization innovation and social capital; in the context of Malaysian university-industry-community partnership project ecosystem revealed that communication dimension have a strong positive relationship with all the three (3) dimension of social innovation namely workplace innovation, organization innovation and social capital. Consistent with the literature and past studies discussed above that effective communication between all actors within the Malaysian university-industry-community partnership project ecosystem provide a significant impact on the transfer process of new knowledge resource that can be used as a new solution towards creating a highly innovative products, processes and services that can give a significant benefits towards social, economic and technological aspects in a concurrent way. The results of hypothesis testing analysis are in line with the descriptive analysis findings of this study. To elaborate further, this study found that actors involved in the Malaysian university-industry-community partnership project ecosystem were highly agree that they can express new knowledge resource and ideas clearly, they can communicate with each other effective and efficiently. Furthermore, they frequently communicate new knowledge resource with each other through verbal and non-verbal approach. They also regularly donating and collecting new knowledge resource with each other and they are also in a high agreement that actors involves always play a leading role in establishing a constructive communication climate throughout partnership project duration.

#### 6.2.1.2.2 Transformation and Social Innovation i.e. Workplace Innovation, Organization Innovation and Social Capital

Transformation is the second dimension of knowledge transfer process developed in this study. The first hypothesis developed in the transformation dimension ($H_{14}$) stated that knowledge transformation is significant positively related with workplace innovation. The results of the hypothesis testing analysis shows a positive significant relationship for this hypothesis. Next, the second hypothesis within the transformation dimension of knowledge transfer process ($H_{16}$) developed in this study stated that knowledge transformation is significant positively related with organization innovation. The results of hypothesis testing analysis of this study provide support for this hypothesis. The third hypothesis involving the transformation dimension of knowledge transfer developed in this study were ($H_{18}$) which stated that knowledge transformation is significant positively related with social capital. The results of hypothesis testing analysis also provide support for this hypothesis.

The literature discussed transformation dimension of knowledge transfer as the transformation of new knowledge resource from sender to receiver regardless of the approach and setting successfully (Cumming & Teng, 2003; Todorova & Durisin, 2007). Zahra and George (2002) further explained that knowledge transformation is dealing with the process of developing and refines previous knowledge resource within the receiver with the newly acquired knowledge from sender in order to create new innovation. Miller, (2012) and Cegarra-Navarro et.al., (2014) supported the statements above by highlighting that transformation dimension of knowledge transfer is refers to the ability of sender and receiver of knowledge resource to leverage and convert the newly acquired knowledge resource to be utilised efficient and effectively and subsequently creates new innovation within products, processes and services. Antonelli, (2000) and Liyanage et.al., (2009) describe that transformation dimension concern with the level of accuracy of new knowledge resource being transformed from sender to

receiver so that the receiver can fully utilised it as a new innovation within the organization. The main underlying premise of transformation dimension of knowledge transfer process is the ability and capacity of an individual and organization to absorb newly acquired knowledge resource into innovation within the products, processes and services (Lichtenthaler, 2009; Camison & Fores, 2010). Zahra and George (2002) and Audretsch, (2007) assert that transformation may be achieved by interpreting and combining existing knowledge resource with newly acquired knowledge resource in a different and innovative way in order to creates new innovation within products, processes and services that can contributes towards social, economic and private benefits.

Empirical findings from past studies among others Vega-Jurado et.al., (2008), Rossi (2014), and Caiazza et.al., (2015) revealed that sender and receiver of knowledge resource that have a good ability and absorption capacity to transform and absorb the newly acquired knowledge resource and hence combining with their existing knowledge resource is significant in creating newly superior, valuable and unique knowledge resource that can be embedded into products, processes and services that makes them inimitable and consequently improves wider society quality and quantity of life, enhance economic growth and ensuring long-term business prosperity (Bartlett & Ghoshal, 2013). Moreover, studies by Gebauer et.al., (2012), Hotho et.al., (2012) and Wensley and Navarro, (2015) found that absorptive capacity, social integration and interaction and unlearning context contributes significantly towards transformation dimension in order to interpret and combining knowledge resource in an effective and efficient way and subsequently facilitates organization towards developing new highly innovative products, processes and services which in turn offers society to enjoy a various innovative and high-end products and at the same times improves their quality and quantity of life (Lee & Restrepo, 2015). Absorptive capacity is the ability to recognise the

value of new knowledge, to assimilate it and to apply it to commercial ends (Cohen & Levinthal, 1990). Social integration and interaction can be formal and informal which consist of job rotation, participation in decision making, informal meeting and social network. These activities promotes transformation of new knowledge resource (Vega-Jurado et.al., 2008). Unlearning context involves identifying inaccurate and incomplete of old knowledge resource and to be replaced with new modified knowledge and subsequently change the cognitive structures, mental models and core assumptions which guide behaviour of employees and organization (Cepeda-Carrion, 2012).

The results of hypothesis testing analysis of transformation dimension and social innovation i.e. workplace innovation, organization innovation and social capital; in the context of Malaysian university-industry-community partnership project ecosystem revealed that transformation dimension have a strong positive relationship with all the three (3) dimension of social innovation namely workplace innovation, organization innovation and social capital. This indicates a consistent findings with the literature and past studies about the significant impact regarding the level of accuracy of new knowledge resource being transformed and can be fully utilised as a new innovation into products, processes and services that can contributes towards social, economic and private benefits. Furthermore, empirical results also indicates that all actors within the Malaysian university-industry-community partnership project ecosystem aware of their competencies to eliminate obsolete old knowledge resource and replace it with newly acquired knowledge for new innovation which refers to unlearning context. The empirical results also shows that actors regularly meet to discuss on the progress of transformation and utilisation of newly acquired knowledge towards products, processes and services development that refers to the social integration and interaction within transformation dimension. Interestingly, it was also found that the actors in a slightly low

agreement in terms of their ability to transform new knowledge resource into practical work and their capability to absorb new knowledge resource and utilised it as a new valuable resource of new innovation. Similalry, Bierly, et.al., (2009) and Todorova & Durisin, (2007) found that the success of creating a new highly innovative products, processes and services which extract from new valuable knowledge resource developed within the transformation dimension of knowledge transfer is greatly dependent upon the ability of an actors to transform and absorb a new knowledge resource into the organization setting. Therefore, there is a room for improvement for actors in the Malaysian university-industry-community partnership project so that they can become competent and capable in terms of their ability to transform and to absorb new knowledge resource into practical work for new innovation. Table 6.1 below summarise the hypothesis testing analysis results of knowledge transfer and social innovation that represents the second objective and question of this study.

Table 6.1

*Research Objective 2, Research Question 2 and Summary Results of Knowledge Transfer and Social Innovation*

| **Research Objective 2** | **Research Question 2** | **Dependent Variables: Social Innovation** | **Independent Variables: Knowledge Transfer/Dimension** | **Test of Hypothesis** | | | |
|---|---|---|---|---|---|---|---|
| To examine the relationship of knowledge transfer process with social innovation within the context of Malaysian university-industry-community partnership ecosystem | To what extend knowledge transfer process significantly influences social innovation within the context of Malaysian university-industry-community partnership ecosystem? | Workplace Innovation; Organization Innovation; Social Capital | Communication | H13 | B=.094 | p<0.05* | Supported |
| | | | Transformation | H14 | B=.112 | p<0.05* | Supported |
| | | | Communication | H15 | B=.127 | p<0.05* | Supported |
| | | | Transformation | H16 | B=.104 | p<0.05* | Supported |
| | | | Communication | H17 | B=.142 | p<0.05* | Supported |
| | | | Transformation | H18 | B=.124 | p<0.01** | Supported |

Notes: ** p<0.01, *p<0.05

#### 6.2.1.3 To Examine the Relationship of Knowledge Application Process with Social Innovation within the Context of Malaysian University-Industry-Community Partnership Ecosystem

In relation to the third research objective and question above, knowledge application process act as the third independent variable of the study represents by the dimensions of exploration and exploitation, whereas dependent variable of social innovation were represents by workplace innovation, organization innovation and social capital. The empirical findings of this study is based on the actual sample size of 218 respondents which represents the partnership projects of Malaysia university-industry-community partnership. As many as six (6) hypothesis developed in this study in order to examine the relationship of knowledge application process with social innovation within the context of Malaysian university-industry-community partnership ecosystem. Therefore, the following sub-section will start with the discussion on the dimension of exploration and followed by exploitation dimension with their social innovation dimensions.

##### 6.2.1.3.1 Exploration and Social Innovation i.e. Workplace Innovation, Organization Innovation and Social Capital

Exploration is the first dimension of knowledge application process developed in this study. The first hypothesis developed in the exploration dimension ($H_{19}$) stated that knowledge exploration is positively related with workplace innovation. The results of the hypothesis testing analysis shows a positive significant relationship for this hypothesis. The second hypothesis within the exploration dimension of knowledge application process ($H_{21}$) developed in this study stated that knowledge exploration is significant positively related with organization innovation. The results of hypothesis testing analysis of this study provide support for this hypothesis. The third hypothesis involving the exploration dimension of knowledge application developed in this study were ($H_{23}$) which stated that knowledge

exploration is significant positively related with social capital. The results of hypothesis testing analysis also provide support for this hypothesis.

Within the literature, exploration dimension is refers to the application of knowledge to produce new products, processes and services (March, 1991; Gupta et.al., 2006). According to He and Wong (2004), exploration dimension of knowledge application is the central process of innovation component whereby new knowledge resource is applied into products, processes and services to make them highly innovative. The evidence of successful exploration of new knowledge resource into products, processes and services can be seen through knowledge entrepreneurial activities among others patenting, licensing and various start-up company established from exploration process (Breznitz, 2011). The underlying premise of new innovation and competitive advantage is said to be largely dependent upon the success of the exploration of knowledge resource into products, processes and services rather than the knowledge resource itself (Alavi & Leidner, 2001). Previous recent studies from Eriksson, (2013), Goldstein et.al., (2015) and Miller et.al., (2016) found evidence that succesful exploration of new inimitable knowledge resource into products, processes and services had a positive effects on social innovation. Each of the study revealed that the successful exploration of new knowledge resource invent and introduce products, processes and services that are completely new and highly innovative and this in turn fulfil the requirements of wider society needs, wants and preference which subsequently improve social quality and quantity of life, improve economic growth and enhance organization performance. Furthermore, El Ariffeen et.al., (2013) also revealed that exploration of new valuable knowledge resource creates a highly innovative medical products, processes and services which used to treat, diagnose and examine critical diseases and this in turn contributes towards enhance people's health, stimulates economic sector and technological advances. A

part from that, studies by Camison & Fores, (2010) and Cepeda-Carrion et.al., (2012) found that successful exploration of new knowledge resource requires thorough observation of technological trends and public demands in terms of offering society with a completely new products, processes and services that can contribute towards solving social, economic and technological problems concurrently (Pue et.al., 2015).

The results of hypothesis testing analysis of exploration dimension and social innovation i.e. workplace innovation, organization innovation and social capital; in the context of Malaysian university-industry-community partnership project ecosystem revealed that exploration dimension have a positive relationship with all the three (3) dimension of social innovation namely workplace innovation, organization innovation and social capital. This indicates a consistent findings with the literature and past studies about the significant impact of exploration dimension in producing new products, processes and services through superior knowledge resource that subsequently give a significant outcome towards social, economic and technological benefits. Furthermore, the empirical evidence of this study also revealed that the Malaysian university-industry-community partnership project invents and introduces new products, processes and services that are completely new. However, from the analysis it can also be found that the majority of the actors within Malaysian university-industry-community partnership project have a slightly low agreement about them having a thoroughly observed technological trends and public demands in terms of producing a completely new products, processes and services that can be offered to the society at large throughout their project duration. This reflect the above findings by Camison & Fores, (2010) and Cepeda-Carrion et.al., (2012), whereby successful exploration of knowledge resource requires thorough observation of technological trends and public demands in terms of offering society with a completely new products, processes and services that can contribute towards solving

social, economic and technological problems concurrently (Pue et.al., 2015). Hence, the above aspect must be address accordingly so that the new products, processes and services created within the Malaysian university-industry-community partnership project meet the society expectation, needs, wants and preference and ultimately improve social quality and quantity of life, improve economic growth and enhance private benefits.

#### 6.2.1.3.2 Exploitation and Social Innovation i.e. Workplace Innovation, Organization Innovation and Social Capital

Exploitation is the second dimension of knowledge application process developed in this study. The first hypothesis developed in the exploitation dimension ($H_{20}$) stated that knowledge exploitation is significant positively related with workplace innovation. The results of the hypothesis testing analysis shows a positive significant relationship for this hypothesis. The second hypothesis within the exploitation dimension of knowledge application process ($H_{22}$) developed in this study stated that knowledge exploitation is significant positively related with organization innovation. The results of hypothesis testing analysis of this study provide support for this hypothesis. The third hypothesis involving the exploitation dimension of knowledge application developed in this study were ($H_{24}$) which stated that knowledge exploitation is significant positively related with social capital. The results of hypothesis testing analysis also provide support for this hypothesis.



Within the literature, exploitation dimension is refers to the application of knowledge resource to refined the organization existing products, processes and services (He & Wong, 2006). March, (1991) and Jansen et.al., (2006) highlighted organizational needs to response to the intensity of competition and the fast pace of economic changes by exploiting new knowledge resource in order to refine products and technology. In tandem with the previous statement, they asserts that exploitation process must improve existing products, processes

and services and therefore, it is critical for a frequent implementation of adaption of new knowledge resource towards existing products, processes and services within the exploitation process. Studies by Bathelt et.al., (2010), Breznitz, (2011) and Geiger, (2012) also shows that exploitation process had a positive relationship with social innovation. They found evidence that exploitation process enable firms to apply and incorporate the new knowledge resource into a new operational and routines and subsequently refine and expand firms existing products, processes and services into a new highly innovative products, processes and services that contribute towards social, economic and technological payoffs.

The results of hypothesis testing analysis of exploitation dimension and social innovation i.e. workplace innovation, organization innovation and social capital; in the context of Malaysian university-industry-community partnership project ecosystem revealed that exploitation dimension have a positive relationship with all the three (3) dimension of social innovation namely workplace innovation, organization innovation and social capital. This indicates a consistent findings with the literature and past studies about the significant impact of exploitation dimension in refining the existing products, processes and services through superior knowledge resource that subsequently give a significant outcome towards social, economic and technological benefits. The results of this study also found that actors in the Malaysian university-industry-community partnership project have a higher agreement in terms of exploitation process is improving their existing products, processes and services in the partnership project and they frequently implements an adoption of new knowledge resource towards existing products, processes and services within their partnership project.

Table 6.2

*Research Objective 3, Research Question 3 and Summary Results of Knowledge Application and Social Innovation*

| **Research Objective 3** | **Research Question 3** | **Dependent Variables: Social Innovation** | **Independent Variables: Knowledge Application/Dimension** | **Test of Hypothesis** | | | |
|---|---|---|---|---|---|---|---|
| To examine the relationship of knowledge application process with social innovation within the context of Malaysian university-industry-community partnership ecosystem | To what extend knowledge application process significantly influences social innovation within the context of Malaysian university-industry-community partnership ecosystem? | Workplace Innovation; Organization Innovation; Social Capital | Exploration | H19 | B=.114 | p<0.05* | Supported |
| | | | Exploitation | H20 | B=.184 | p<0.05* | Supported |
| | | | Exploration | H21 | B=.212 | p<0.01** | Supported |
| | | | Exploitation | H22 | B=.150 | p<0.05* | Supported |
| | | | Exploration | H23 | B=.097 | p<0.05* | Supported |
| | | | Exploitation | H24 | B=.149 | p<0.05* | Supported |

Notes: ** p<0.01, *p<0.05

Apart from the empirical findings above, other descriptive analysis results in this study found that actors have a low agreement in the social capital dimension of social innovation in terms of actors having a close relationship in the partnership project for example doing recreational activities and informal gathering with each other. Furthermore, they also have a low agreement in terms of them having a formal and informal face to face meeting with each other and frequent meeting outside the project formal activities to socialise and discuss with each other's. This indicates that low social ties among actors in the Malaysian university-industry-community partnership project. Inkpen and Tsang, (2005) have offered a clear evidence that social ties and social relation have a significant impact on leveraging new superior knowledge resource among individual. According to Levin and Cross (2004), people prefer to turn to other people rather than documents for knowledge resource and strong social ties promote the transfer of tacit knowledge resource. In addition, Blumenberg et al., (2009) also suggested that frequent face-to-face interaction is crucial for transferring tacit knowledge resource and this demand a close social partnership between individuals. Study by Zahra and George (2002) identify that social ties and integration help to reduce the barrier to new knowledge resource exchange within an organization.

Simultaneously, based on the descriptive analysis of human resource management dimension of control variable, the result indicates that the selection process of actors to be participate in the project of Malaysia university-industry-community partnership is not being done in a rigorous and thoroughly manner. Rossi and Rosli, (2013) highlighted that the heterogeneous pools of actors, each with their own characteristics, purposes and structures can often lead to conflicting objectives and agendas when collaborating within the university-industry-community partnership. Hence, the selection of actors is a crucial process in order to achieve

the harmonised environment among them in terms of high understanding, commitment and involvement (Cosh & Hughes, 2010).

### 6.2.2 The Qualitative Research Objectives and Questions

In relation to address the qualitative research objectives and questions developed in this, as many as eight (8) main themes namely, prior knowledge, knowledge resource outcome, knowledge resource processes, knowledge resource value, recognising type of innovation outcome, roles, challenges and recommendations is generated in order to answer both qualitative research objectives and questions developed in the study. Prior knowledge, knowledge resource outcome, knowledge resource processes, knowledge resource value, recognising type of innovation outcome are the themes for; 4) To explore the level of understanding of association between strategic knowledge management processes and social innovation among actors within Malaysian university-industry-community partnership ecosystem. In addition, roles, challenges and recommendation are the themes generated to answer the second qualitative research objective which is 5) To identify actor's roles and the key factors that can potentially impedes the process of knowledge application within Malaysian university-industry-community partnership ecosystem in achieving social innovation.

Based on the results indicates that academic actors have a strong prior knowledge in the past in terms of education level, experience level, networks relation and continuous learning motivation and intellectual abilities in order to guide them to understand the association between strategic knowledge management processes and social innovation as compared to the industry and community actors. As for knowledge resource outcome theme, the results shows that academic actor has a comprehensive understanding that strategic knowledge management

processes created knowledge resource that can enhance actors social capital, improve actor's economic growth and also provide technological payoffs in a concurrent way. Industry actors only understand and interested that the outcome of knowledge resource is to fulfilling their private motives and benefits, while community actors see the knowledge resource outcome of this partnership as a social purpose and activity. The theme of knowledge resource process indicates that all academic actors have recognised and understand the actual processes of strategic knowledge management i.e. knowledge creation, knowledge transfer and knowledge application; that took place in the Malaysian university-industry-community partnership project and leads them to understand that these processes give a concurrent benefits to all actors involves in terms of social, economic and commercialization payoffs. However, industry actors only understand and recognised the process of knowledge transfer and knowledge application as the actual processes that take place in the Malaysian university-industry-community partnership project. None of the industry actors can understand and recognised knowledge creation process even though they were also involve in the knowledge creation process within their partnership project. All of them understand that the outcome of both processes help them to developed new products in the markets and simultaneously improve their company performance and innovativeness. Hence, leads towards achieving private benefits and competitive advantage within their company. Community actors understand strategic knowledge management processes as having only knowledge transfer process and associated knowledge transfer process outcome with volunteering activities and charitable contribution program between academia and community members towards fulfilling social obligation.

For knowledge resource value which is the fourth theme in answering the objective of to explore the level of understanding of association between strategic knowledge management

processes and social innovation among actors within Malaysian university-industry-community partnership ecosystem, the results revealed that all of the interviewees that comprise of academic, industry and community actors appeared to be understood and confirm that the partnership project had created new knowledge resource and regards this as a "new novel solution" and "new innovation" that can be embedded into products, processes and services. Furthermore, all interviewees also confirm that they had gained a diverse new knowledge resource form other actors within the partnership project. Finally, the fifth theme is the type of innovation outcome which is the most important theme derived from the interview data. It is found that all academic actors agreed that their partnership project successfully developed a new highly innovative product and this product leads to enhance new knowledge resource, skills and expertise. Therefore, it benefited industry partners in terms of private gains and also community in terms of improving their social well-being. For industry actors all of them agreed that their partnership project successfully creates a new highly innovative product and add value to their existing product. However, all of them only highlighted and focus on private benefits and commercial driven profits. Community actors also agreed that the partnership project developed new innovative things that can be used for the benefits of their community. However, all the community actors only focus and incline their perception and beliefs towards corporate social responsibility and pure social purpose.

For answering the second qualitative research objective and question namely; to identify actor's roles and key factors that can potentially impedes the process of knowledge application within Malaysian university-industry-community partnership ecosystem in achieving social innovation, the result had revealed three main themes namely; roles, challenges and recommendations. For roles theme, the results shows that, all of academic actors have a uniform understanding that their main roles within the partnership project

specifically within the knowledge application process are as the main producer of new knowledge resource, the main transferor of new knowledge resource, knowledge resource co-implementer, knowledge resource mediator and facilitator and consultant towards product commercialization process. As for industry actors, their roles in the knowledge application process were as new knowledge resource implementer, new knowledge receiver and also involved performing duties that are related to the commercialization process for example act as a leader, mediator and the main implementer of commercialization processes. Community actors indicates that their roles in the knowledge application process only as knowledge receiver and knowledge disseminator.

The next main theme is challenges. The result shows that all of the actors highlighted the issue of conflicting interest, high bureaucracy practices, business disclosures issues, innovation requirements issues, understanding and commitment issues and financial constraints issues are the main key factors that can potentially impede the process of knowledge application within the Malaysian university-industry-community partnership project ecosystem in achieving social innovation outcome. According Bramwell et. al., (2012), actors in university-industry-community partnership resemble heterogeneous pools of actors, each with their own characteristics, purposes and structures and this can often lead to conflicting objectives, interest, priorities and agendas when having collaboration. Conflicting interest factors indicates that actors within Malaysia Malaysian university-industry-community partnership project appeared to have different objective, interest and priorities to get involved in the partnership project. For example, academic actors interested in funding opportunities for future research, creates future research networking and also focusing on the provision of knowledge and training. As for industry actors, their primary motive is to gain financial profit, to introduce a new product line, to maintain control over market, to overcome

market saturation and also to secure competitive advantage over competitors and community actors they appeared to show that, their involvement in the partnership project only to fulfil social responsibility. High bureaucracy practices factor indicates that when actors within the Malaysia university-industry-community partnership project creates new highly innovative products, processes and services within the partnership project, they find it hard to commercialised of the products, processes and services due to the difficulties in complying the requirements from various related authority in connection with products commercialization and also too much administrative complexity. Furthermore, business disclosure and understanding and commitment issues indicate difficulties face by actors in terms of attracting the interest and to have a full commitment from other actors in relation to the partnership project. For example in terms of disclosure of existing business strategy and plan, business processes and other related matters. Specifically, difficulties in order to convinced them in terms of the relevancy and the benefits that they might gained when they become part of the partnership project without having stressed more on commercial and private benefits. Innovation requirements factor indicates actors having a difficulty in terms of selection of supplier that could meet with the accurate specifications of items ordered based on the scientific formula created within this partnership project. In addition, financial constraints indicate actor's limitation in terms of financial resources in order to become ever ready in the knowledge application process.

Finally, academic, industry and community actors suggests a recommendations that must be undertaken in order to improves and added value to the knowledge application process of Malaysia university-industry-community partnership project. They suggesting factors among others continuous participation and direct involvement from all actors, continuous high commitment and good relationship, high awareness, improves financial obligation, open up

un-learn and re-learn attitude and synchronised of norms, standards and values, primary mission and objectives among actors. They also highlighted that government may assist in terms of initiating policies and procedures that may help to overcome the issues of innovation requirement and to ease high bureaucracy practices among related authorities in order to commercialise the products, processes and services created within the partnership project.

## 6.3 Contribution of the Study

As a result of the findings in the quantitative and qualitative (sequential exploratory method) of this study, valuable contribution have been made in terms of theoretical, methodological and practical contribution in this study.

### 6.3.1 Theoretical Contribution

This research provides significant contribution to the theory and literature understudy with regards to the social innovation and its association with strategic knowledge management processes within the platform of university-industry-community partnership. This study used the combination of Resource Based Theory (RBV) and Knowledge Based Theory (KBV) in explaining the phenomena of research undertaken. RBV theory states that resources and capabilities that are valuable, rare, inimitable and no substitute contribute positively towards social innovation (Maruyama et.al., 2007; Gardner et.al., 2007; Battisti, 2012). Consequently, knowledge resource has emerged as the valuable, rareness, inimitable and no substitutable of intangible resource that can lead to achieving social innovation (Hoffman et.al., 2006; Lavie, 2006; Sanzo-Perez et.al 2015). Within the KBV theory, knowledge is regarded as the most significant resource (Nonaka & Takeuchi, 1995; Grant, 1996) and focuses specifically on the nature and role of knowledge resource in order to achieve new innovation (James, 2004). KBV theory also highlighted superior knowledge resource embedded into products,

processes, and services that provide long term solution and competitive advantage to the organization and subsequently contribute towards solving social, economic, and technological problems (Rossi, 2010; Perkmann et.al., 2011; Bramwell et.al., 2012; Perkmann & Salter, 2012). Thus, the use of both theories within this study, explained precisely about the association of social innovation as a new innovation outcome strategy and strategic knowledge management processes and contributes towards better understanding on the phenomena under study and how it relates with RBV and KBV theories.

The findings of this study contributes to the literature aspect whereby there is a paucity of study to date examining social innovation as a new innovation outcome strategy through the processes of strategic knowledge management within the context of university-industry-community partnership (Benneworth & Cunha, 2015). To elaborate further, this study provides empirical evidence that strategic knowledge management processes that comprise knowledge creation, knowledge transfer, and knowledge application have significant impacts on social innovation and contribute massively towards social, economic, and technological aspects. Hence, this study findings strengthen and support past empirical results within the literature understudy and address an urgent need of comprehensive overview and analysis on the empirical evidence of social innovation and strategic knowledge management processes within the literature. Apart from that, this study also provides contribution in terms of empirical findings on knowledge application process by unravelling the roles and challenges of actors in the knowledge application process whereby it is very limited within the literature and almost no evidence found in the context of Malaysia on how knowledge resource is being applied within the context of Malaysian university-industry-community partnership in achieving social innovation.

Furthermore, this study also contributes by giving an advance knowledge in terms of conceptual understanding and better insights as to how social innovation and strategic knowledge management processes are associated together and in turn lead to a better living standards, better health condition among people, better education, enhance jobs opportunity, enhance economic growth, and private needs and also enhances the development of innovative human capital and definitely broadens the knowledge of prevailing literature in the context of social innovation. Specifically, this study also addressed a call by researchers among others Battisti, (2012), Lizuka et.al., (2013), Altuna et.al., (2015), Makimattila et.al., (2015), Benneworth and Cunha (2015) and Unceta et.al., (2016) who stress the need for more research on a complete and extensive understanding on the insight of how social innovation and strategic knowledge management processes are linked and connected across organizations where literature confirmed it is very much under-developed, very limited, and inconsistent. This study contributes to the knowledge in this area by providing deeper insights on the integration of economic and technological aspects into existing social aspect of social innovation where has been identified as a huge gap within the literature. Apart from that, as the empirical evidence in this study was acquired from the Malaysian university-industry-community partnership project, the framework, model and hypothesis development used in this study can be replicated and tested on other similar public and private partnership projects in Malaysia and ASEAN countries. This has laid down a foundation and groundwork for future researchers to use as a template in order to examine and gain deeper insights on strategic knowledge management processes and social innovation and enhance understanding of the interrelated nature of social innovation and strategic knowledge management processes in different settings. The literature of social innovation also argued and criticized that the concept and measurement of social innovation is unclear, very subjective, ambiguous, and has no fixed boundaries in an attempt to examine its emergence, diffusion and most importantly

its contribution towards social, economic and technological aspect in the context of new innovation outcome strategy (Klievink & Janssen 2014; Baker & Mehmood, 2015; Ionescu, 2015). By using workplace innovation, organization innovation and social capital as the dimensions of social innovation, this study contributes massively towards narrow down and helps to enhance precise focus in measuring social innovation which is criticized as unclear, very subjective and ambiguous in the literature. Moreover, the dimensions of socialization, externalization, combination and internalization used in knowledge creation; communication and transformation used in knowledge transfer; and exploration and exploitation used in knowledge application; as independent variables also helps to measure precisely the strategic knowledge management processes and all of the measurement instruments has been rigorously tested and validated.

### 6.3.2 Practical Contribution

Social innovation as a new innovation outcome strategy has been addressed in the Malaysian RMK-10 and RMK-11 respectively with the hope to propel Malaysia to achieve a high income country status by the year 2020. Both plans focuses on the people which act as the centre piece of any development efforts. By focusing on the people and deliver a better quality and quantity of life to all Malaysian, Malaysia is expected to achieve high impact outcomes to the capital economy, productivity and innovation as well as the well-being of the people at large. Apart from that, Social innovation as a new innovation outcome strategy is expected to help Malaysia to achieve real GDP percentage of 6 % per annum, Gross national income per capita of USD 15,690.00 which is the threshold of high income country, average monthly household income of USD 2,763.00 and also to increase the quality and quantity of life of the people's index to 1.7 % per annum. Social innovation is adopted through the platform of university-industry-community partnership within the Malaysian ecosystem. This

involves various actors namely: academicians, industry, community and government. All of this actors acts as an agent that develops and giving assistance in creating superior knowledge resource within the Malaysian university-industry-community partnership project that can be embedded into products, processes and services to make them highly innovative and subsequently contributes towards social, economic and technological benefits and hence, fulfil the aspiration of Malaysian government in achieving a high income country status by the year 2020. Thus, this study output provides huge benefits to the various actors mentioned above.

It was evident that the empirical findings of this study found that socialization aspects in terms of face to face meeting, open dialogue and community of practice among actors, shared experience and hands-on experience, formal and informal social meeting, formal and informal joint activities and interactions, mentoring, observations and imitations is less happening and insignificant in Malaysia ecosystem. This is somewhat contradict and inconsistent as per describe and suggested by the literature. Thus, intervention and improvement are needed in terms of improving actors social integration, social activities and social ties together in the Malaysian university-industry-community partnership project ecosystem so that the new knowledge resource can be efficiently and effectively created and can be used as a new solution towards creating a highly innovative products, processes and services that can give a significant benefits towards social, economic and technological aspects in a concurrent way. Zahra and George (2002), Levin and Cross (2004) and Inkpen and Tsang, (2005) offered a clear evidence that social integration, social interaction activities and social ties have a significant impact on leveraging new superior knowledge resource among individual.

Furthermore, the study also found that actors in the Malaysian university-industry-community partnership project need to improved and increase the level of trust, interpersonal relationship and openness and also to overcome cultural and language differences among them within the partnership project. Edmondson et.al., (2012) and Rossi and Rosli (2013) highlighted that when actors with different background and culture work well within the partnership, the discovery driven culture of the university with the innovation driven environment of the industry and community is achieved in an effective and efficient manner. Therefore, all actors must understand their characteristic and potential (Ternouth et.al., 2012). Actors also must equip themselves with good ICT knowledge on how to reconfigure, diffuse and systemize new explicit knowledge resource leverage from other actors within the partnership project. If they have limited knowledge in terms of ICT practises, this perhaps may become a barrier in order to have an effective and efficient process of creating a new superior explicit knowledge resource within the partnership project. Hence, an emphasis must be given to all actors that involves in the Malaysian university-industry-community partnership project in terms of having a good literacy in using ICT facilities so that they become expert and well-trained in order to reconfigure, diffuse and systemize new explicit knowledge resource that is leverage from other actors within the partnership project. Actors in the Malaysian university-industry-community partnership project ecosystem is somewhat incompetent in terms of presenting their explicit knowledge resource into a comprehensive and well-structured documents so that it become easier for other actors of partnership project to be able to understand, absorb and applied and becoming their core distinctive capabilities in the form of new superior tacit knowledge resource that can enhance innovation capabilities, social value and social capital. Hence, some corrective measures must be taken in order to make sure that explicit knowledge resource of actors involved in the Malaysian university-industry-community partnership project ecosystem are comprehensive and in a well-structured manner so that it can provide

benefits of new tacit knowledge resource to other actors and organization within the partnership and makes them becoming a more highly innovative and dynamically capable.

This study found that actors within the Malaysian university-industry-community partnership project need to improve on the ability to transform new knowledge resource into practical work and also in terms of their capability to absorb new knowledge resource and utilised it as a new valuable resource for new innovation. Therefore, there is a room for improvement for actors in the Malaysian university-industry-community partnership project in terms of their competency and capability to transform and to absorb new knowledge resource into practical work for new innovation. Actors within Malaysian university-industry-community partnership project also need to thoroughly observe technological trends and public demands in terms of producing a completely new products, processes and services that can be offered to the society at large throughout their project duration. This aspect must be addressed accordingly so that the new products, processes and services created within the Malaysian university-industry-community partnership project meet the society expectation, needs, wants and preference and ultimately improve social quality and quantity of life, improve economic growth and enhance private benefits. Furthermore, this study also contributes towards human resource management of Malaysian university-industry-community partnership project. The study found that, the selection process of actors to be participate in the project of Malaysia university-industry-community partnership is not being done in a rigorous and thoroughly manner. Rossi and Rosli, (2013) highlighted that the heterogeneous pools of actors, each with their own characteristics, purposes and structures can often lead to conflicting objectives and agendas when collaborating within the university-industry-community partnership. Hence, the selection of actors is a crucial process and there is a need of rigorous and thorough procedures

in terms of actor's selection in order to achieve the harmonised environment among them in terms of high understanding, commitment and involvement.

For the qualitative results of this study found that a better understanding on social innovation as a new innovation outcome strategy must be internalized and institutionalized by all actors involved in the Malaysia university-industry-community partnership projects. Moreover there is an urgent need of synchronization of the missions, objectives, interest and priorities of the actors involves, so that differences in norms, standards and values and also primary mission and objectives can be overcome. Factors such as high bureaucracy practices, business disclosures issues, innovation requirements issues, understanding and commitment issues and also financial constraints issues must be taken into consideration for improvements and to added value towards the existing policy and procedures.

## 6.4 Limitation of the Study

All study has its limitations and this study is no different. First, the respondents of quantitative data i.e. questionnaires; of this study only involved the project leader that represent by academic actor of each partnership project in order to answer the questionnaires develop in this study. This is due to the nature of the study, its inherent time constraint and also in terms of the commitment by other respondents which they are always busy with their daily routine and work schedule, the target respondent only limited to the project leader i.e. academic actor. Generally, each partnership project of Malaysia university-industry-community partnership projects consist of five (5) actors that comprises of two (2) academic actors, one (1) industry actors, one (1) community actor and one (1) graduate internship.

Next, the study is carried out in a cross-sectional setting in terms of data collections. The commercialization process of the products, processes and services within the Malaysia university-industry-community partnership projects is somewhat goes beyond the partnership project duration. For that reason, this study are not being able to observe and measures the long-term commercialization outcomes of Malaysia university-industry-community partnership projects towards achieving social innovation.

Furthermore, measurement items used in all of the dimensions of dependent and independent variables in this study is adapted from the framework and questionnaires of developed countries. Differences may occurs in terms of the nature of social innovation and strategic knowledge management processes is being placed in the developed countries, the policy system within the developed countries, the current social, economic and technological performance and the innovative capability of the people within their highly industrialised environment (Howaldt et.al., 2015). However, all of the measurement items mentioned above are widely accepted within the literature respectively.



## 6.5 Future Research Ideas

This research finding has contributed to the theory, methodology and practice. However, empirical research connecting social innovation and strategic knowledge management is only emerging. Therefore, this study provide agenda for future research to help empirical research within these area.

First, as recognised in the limitations, this study only involved the project leader perspective in answering the questionnaires develop in this study. This could be a limitation in terms of providing a comprehensive outcomes and information's. There is a need for future research to

includes other actors namely industry, community and graduate internship to be part of the respondent towards answering the questionnaires developed in the study. Next, Future research need to adopt a longitudinal setting in terms of data collections. Longitudinal setting is important in order to observe the long term commercialization outcome effect of highly innovative products, processes and services created within the Malaysia university-industry-community partnership projects towards achieving social innovation. Furthermore, due to the differences in terms of the nature of social innovation and strategic knowledge management processes between developed and developing countries, the policy system, the current social, economic and technological performance and the innovative capability of the people, there is a need for future research to developed its own measurement items for social innovation and strategic knowledge management processes which act as the dependent and independent variable in the developing countries. Therefore, developing country like Malaysia can take on their own lessons and also have their own experience in examining the impact of strategic knowledge management processes on social innovation, much importantly to ensure social innovation will contributes significantly towards achieving the indicators of Malaysia becoming a high income country nation by the year 2020.

## 6.6 Concluding Remarks

This chapter was the final chapter of this study. The study outputs provide an ideas and solutions for all actors to work together in an effective an efficient way within their partnership projects. The study outputs also helps the Malaysian government in terms of adding value to the existing policy and statutory initiatives concerning on social innovation, to frame a different or better policy and statutory initiatives in the future, to make interventions and act as a check and balance in ensuring the progress and success of the partnership project so that, it in line with the main objectives and aspirations that are enshrines in the RMK-10

and RMK-11 which is to achieve social innovation as a new innovation outcome strategy through strategic knowledge management processes within Malaysia university-industry-community partnership projects. This study discover that socialization aspects in terms of face to face meeting, open dialogue and community of practice among actors, shared experience and hands-on experience, formal and informal social meeting, formal and informal joint activities and interactions, mentoring, observations and imitations is less happening and insignificant in Malaysia ecosystem. In addition, the needs to improve on the actors ability to transform new knowledge resource into practical work and also in terms of their capability to absorb new knowledge resource and utilised it as a new valuable resource for new innovation. Actors also must equip themselves with good ICT knowledge on how to reconfigure, diffuse and systemize new explicit knowledge resource leverage from other actors within the partnership project.

The other significant findings found in this study was to synchronized the missions, objectives, interest and priorities of the actors involves, so that differences in norms, standards and values and also primary mission and objectives can be overcome. Factors such as high bureaucracy practices, business disclosures issues, innovation requirements issues, understanding and commitment issues and also financial constraints issues must be taken into consideration for improvements and to added value towards the existing policy and procedures. The contribution is then explained as related to the findings of this study. The contributions cover the theoretical, methodological and practical aspects. This chapter then closed by identifying the limitations of the study and gave suggestions for future research ideas. Therefore, it was concluded that the researcher successfully fulfilled the questions and objectives which the study set out to examine and explore.

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## PUBLICATIONS DERIVED FROM THE THESIS

1. Jali, M.N., Abas, Z., & Ariffin, A.S. (2017). Social Innovation in the context of Strategic Knowledge Management Processes for Supply Chain Performance Enhancement. **International Journal of Supply Chain Management.** Volume 6, No. 1, pp**.** 233-238. **(Scopus Indexed Journal).**

2. Jali, M. N., Abas, Z., & Ariffin, A. S. (2017). Corporate Social Responsibility and Corporate Social Innovation: A Conceptual Understanding. SHS Web of Conferences Vol. 34, pp. 01001. EDP Sciences. **(ISI Indexed Journal).**

3. Abas, Z., & Jali, M. N. (2015). Understanding knowledge management in developing emerging concept of innovation and technology into business: Conceptual review and empirical evidence. **International Academic Research Journal of Business and Technology**. 1(2) 2015, pp. 149-164. **(Refereed Journal).**

4. Jali, M.N., Abas, Z., & Ariffin, A.S. (2016). Addressing Social Innovation in the Malaysian Knowledge Transfer Program: Gaining a Preliminary Insight. **IOSR Journal of Business and Management (IOSR JBM)**, Volume 18, Issue 10. Ver. IV (October. 2016), pp. 56-64. **(Refereed Journal)**.

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6. Jali, M.N., Abas, Z., & Ariffin, A.S. (2016). Social Innovation and Knowledge Resource: A Conceptual Understanding. **Journal of Business and Economics**, Volume 7, No.9. (2016), pp. 1596-1603. **(Refereed Journal).**

7. Jali, M.N., Abas, Z., & Ariffin, A.S. (2016). Addressing Social Innovation in the Malaysian University-Industry-Community Knowledge Transfer Partnership: A Preliminary Empirical Insight. **Journal of Business, Management and Accounting (JBMA-UUM).** Paper acceptance date for publication: 6th February 2017. Paper will be published in June 2017. **(Refereed Journal).**

**CONFERENCE PROCEEDINGS DERIVED FROM THE THESIS**

1. Jali, M.N., Abas, Z., & Ariffin, A.S. (2016). Social Innovation and Strategic Knowledge Management Processes: A critical conceptual overview: **Proceedings of Knowledge Management International Conference (KMICe) 2016**. Chiang Mai, Thailand. pp. 411-415. UUM College of Arts and Sciences, Universiti Utara Malaysia (UUM), Sintok Kedah Malaysia. 29 – 30 August 2016.

2. Jali, M.N., Abas, Z., & Ariffin, A.S. (2016). Corporate Social Responsibility and Corporate Social Innovation: A Conceptual Understanding: **Proceedings of 17th Asian Academic Accounting Association Annual Conference (fourA) 2016**. Kuching, Sarawak Malaysia, 20-22 November 2016.

3. Jali, M.N., Abas, Z., & Ariffin, A.S. (2016). Addressing Social Innovation in the Malaysian Knowledge Transfer Program: Gaining a preliminary insight: **Proceedings of the 3rd National Conference on Knowledge Transfer 2016**. Penang, Malaysia. 30 November-1 December 2016.

4. Jali, M.N., Abas, Z., & Ariffin, A.S. (2016). Social Innovation: A New Paradigm of Innovation Outcome Strategy in the Context of Strategic Knowledge Management Processes: **Proceedings of International Conference on Technology Management and Business 2016**. Kangar, Perlis, Malaysia. 13th December 2016.

# APPENDIX B

Research Questionnaires and Semi-Structured Interview Protocol Questions

CRITICAL AGENDA PROJECT
KNOWLEDGE TRANSFER PROGRAMME – KTP
MINISTRY OF HIGHER EDUCATION MALAYSIA

# Knowledge Transfer Programme - KTP

**Survey on KTP Grant Scheme under RMK-10 (2011-2015)**

**"The Impact of Strategic Knowledge Management Processes on Social Innovation Practises"**

Dear Participants,

I hope that you can spend some of your priceless time to answer the questionnaires given. The information that you provide will help us to gain a better insights and improved understanding on the situation concern with the study.

You will remain completely anynymous and the response is strictly confidential. Only members within the research team will have access to the information given. Thank you very much for your time and cooperation.



Your Sincerely,

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Muhamad Nizam Jali

Pusat Pemindahan Ilmu (KTP)
Pejabat Pengurusan TORAY-USM KTC

Contact Number : +6 011 32947246
Email Address : mnj_jali@yahoo.com.my

**KTP Community Chairman:**

Prof.Dr. Zakaria Abas
Email: zakaria@uum.edu.my
Tel : +6 019 417 2466

**SURVEY QUESTIONNAIRES**

**SECTION A: Demograhic Characteristics**

## General Information

1. Age:
   *(Umur)*

2. Jantina:
   (Gender)

3. Education level:
   *(Taraf Pendidikan)*

4. Number of years in service/ industry/ community:
   *(Tahun dalam perkhidmatan/ industri/ komuniti)*

5. Name of KTP project:
   *(Nama projek KTP)*

6. Name of university-industry/ university-community partnership:
   *(Nama hubungan kerjasama universiti-industry/universiti-komuniti)*

7. Duration of university-industry/ university-community partnership:
   *(Tempoh hubungan kerjasama universiti-industri/universiti-komuniti)*

8. Rolling Phase 1st/ 2nd / 3rd/ 4th/ 5th:
   *(Fasa 1/2/3/4/5)*

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

**Tick (/) where approriate.**

| **PART A: Social Innovation**<br><br>**Workplace innovation** | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| 1. Project management team allows work autonomy, empowerment and flexible working schedule. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 2. Project actors frequently work through partnership forum and team work. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 3. Project management team constantly updating project process and allow job rotation among actors. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 4. Project management team concern on the welfare and social security of the actors. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 5. Project leader provide individual support in enhancing actors human resource value through training, sharing knowledge and stimulate learning culture among actors. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 6. The project outcome creates new solution, techniques and methods towards improving products, processes and services. | ☐ | ☐ | ☐ | ☐ | ☐ |

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

**Tick (/) where approriate.**

| **PART A: Social Innovation** | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| **Organization innovation** | | | | | |
| 7. The project management team allows decentralised decision making and flexible job responsibilities. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 8. The project management team constantly encourage actor's social relationship as a medium to enhance social value and propensity to innovate towards project objective. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 9. The project management team implement best practices and provide convenient environment throughout project duration to enhance actor's motivation, performance and participation. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 10. The project management team constantly emphasizes on actor's integration between each other and working as a unit throughout project duration. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 11. The project management team often restructure and redesign project process and structure to adapt to changes during the project duration. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 12. The project management team often implement new administrative system to make the project more cfficient and effective throughout the duration of the project. | ☐ | ☐ | ☐ | ☐ | ☐ |

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

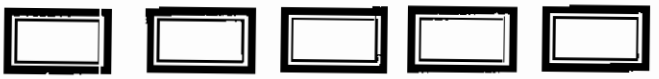
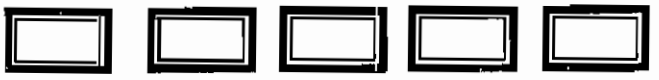
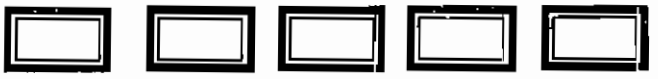
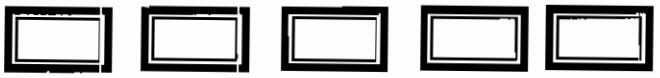
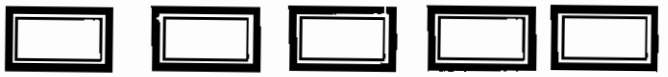
**Tick (/) where approriate.**

| **PART A: Social Innovation** | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| **Social capital** | | | | | |
| 13. All actors in the project shared the same belief, motives and goals towards the success of the project. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 14. All actors in the project are highly trusted and have a high sense of trustworthiness in sharing knowledge. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 15. All actors in the project have close social relationship (example: recreational activities, informal gathering) with each other. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 16. All actors frequently shared any knowledge and information regarding project matters with each other's to improve skills and capabilities. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 17. New solution that can be embedded into products, processes and services is created from shared resources of project actors relationships. | ☐ | ☐ | ☐ | ☐ | ☐ |

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

**Tick (/) where approriate.**

| **PART B: Strategic knowledge management processes** | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| **Knowledge Creation** | | | | | |
| **1) Socialization** | | | | | |
| 18. All project actors spent a lot of time interacting through informal meeting and social activities in order to discuss and exchange ideas, experience and opinion. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 19. The project management team allows sharing experience, observation, imitation and mentoring activities. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 20. Project leader always encourage, motivate and guiding other project actors to have a formal and informal joint activities i.e. open dialogue, spending time together to share experience. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 21. The environment within the project, take place in a high level of trust, interpersonal relationship, openness and low level of cultural and language differences. | ☐ | ☐ | ☐ | ☐ | ☐ |
| **2) Externalization** | | | | | |
| 22. All project actors participate in open dialogue and community of practice with each other to structure and record knowledge. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 23. All project actors have a high sense of trust, high degree of communication, social closeness and shared values. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 24. The project leader/ project management team listens to all opinions and recommendations from every project actors. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 25. All project actors keep new knowledge in documentation i.e. database, intranet files and other computer software, that are easy to understand and shared to others. | ☐ | ☐ | ☐ | ☐ | ☐ |
| **3) Combination** | | | | | |
| 26. All project actors know very well about their roles and responsibility and have a positive attitude towards ICT. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 27. The project management team equip actors with good ICT facilities and allow actors to access other related facilities. | ☐ | ☐ | ☐ | ☐ | ☐ |

| | |
|---|---|
| 28. All project actors are ICT literate in order to reconfigure, diffuse and systemize new knowledge. |  |
| 29. All project actors frequently used ICT facilities in order to communicate and disseminate new knowledge to other actors. |  |
| **4) Internalization** | |
| 30. Project explicit knowledge is written in comprehensive and well-structured documents. |  |
| 31. The project always engages with practical activities such as learning by doing, experimenting, training and simulation. |  |
| 32. Project leader always tolerates failures and continuously encourage trial and error. |  |
| 33. Practical activities enhance all project actors tacit and personal knowledge. |  |
| **Knowledge Transfer** | |
| **5) Communication** | |
| 34. All project actors frequently communicate new knowledge with each other through verbal and non-verbal approach. |  |
| 35. All project actors regularly donating and collecting new knowledge with each other. |  |
| 36. All project actors can communicate with each other effectively and efficiently. |  |
| 37. All project actors can express new knowledge and ideas clearly. |  |
| 38. Project leader always play as a leading role in established a constructive communication climate throughout project duration. |  |
| **6) Transformation** | |
| 39. All project actors have the ability to transform new knowledge into practical work. |  |
| 40. All project actor's record and store new knowledge for future reference. |  |
| 41. All project actors are capable to absorb new knowledge and prepare it for further purposes and to make it available. |  |

42. All project actors aware of their competencies to eliminate obsolete old knowledge and replace it with newly acquired knowledge for new innovation.

43. All project actors regularly meet to discuss on the progress of transformation and utilisation of new acquired knowledge towards products, processes and services development.

**Knowledge Application**

**7) Exploration**

44. The project invents and introduces new products, processes and services that are completely new.

45. The project leader regularly organised special meeting with other actors to acquire new knowledge.

46. All project actors accept instruction that go beyond existing policy and procedures to develop new products, processes and services.

47. The project management team thoroughly observed technological trends and public demands throughout project duration.

48. Project actors frequently utilised new knowledge opportunity throughout project duration.

**8) Exploitation**

49. The project frequently implements adaption of new knowledge towards existing products, processes and services.

50. The project improves existing products, processes and services within the project.

51. Project leader regularly review the development of products, processes and services to exploit of new knowledge.

52. All project actors are capable of recognising the usefulness of new knowledge to combine with existing knowledge within the project.

53. All project actors are capable in sharing new knowledge to improve and refine existing products, processes and services.

| | |
|---|---|
| 54. It is clearly known among actors how activities within the project should be performed. |  |

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

**Tick (/) where approriate.**

| **PART C: Control variables** | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| **Leadership** | | | | | |
| 55. Project leader articulates clear project vision, mission and objectives to other actors. |  | | | | |
| 56. Project leader regularly help other actors to increase level of enthusiasm and intellectual stimulation. |  | | | | |
| 57. Project leader always capable in giving inspirational motivation and guiding other actors to perform related job. |  | | | | |
| 58. Project leader frequently initiate meeting and leading discussion on any particular issues arise in the project. |  | | | | |
| 59. Project leader always guide other actors to look at problems from many different angle. |  | | | | |
| **Organization structure** | | | | | |
| 60. Our project management team provides other actors with easy access to various sources of information. |  | | | | |
| 61. Our project management team allows decentralised decision making made by the project actors. |  | | | | |
| 62. Our project management team/ KTP project secretariat provides adequate resources (ex. financial and non-financial) for actors to think of creative solution and to explore innovative ideas. |  | | | | |
| 63. Our project management team/ KTP project secretariat holds innovative actors and projects in high regard. |  | | | | |
| 64. Our project management team/ KTP project secretariat is tolerant of mistakes. |  | | | | |

| | |
|---|---|
| **Human resource management** | |
| 65. Project actors were rigorously recruited by the project leader in hiring process. |  |
| 66. The project management team frequently provide continuous developmental training opportunities for project actors. |  |
| 67. Our project encourages empowerment and high participation among actors. |  |
| 68. Our project activities involve a lot of teamwork rather than individual work. |  |
| 69. Our project management team/ KTP project secretariat regularly rewards and appraised project actors when they perform excellently. |  |
| **Trust** | |
| 70. We strongly believed that every project actor would not try to take advantage with each another. |  |
| 71. We strongly believed that every project actor keep their words and promises with regards to project matters. |  |
| 72. We strongly believed that our welfare, desire and needs are priority to the project management team/ KTP project secretariat. |  |
| 73. We feel very confident on every project team actor capabilities towards achieving project objectives. |  |
| 74. All project actors have benefited from this partnership. |  |
| **Social ties** | |
| 75. Our project actors frequently having a formal and informal face to face meeting with each other. |  |
| 76. We frequently discuss in person with other actors regarding project matters rather than looking at documents for information. |  |
| 77. We frequently meet outside the project formal activities to socialise and discuss with each other. |  |
| 78. Our project actors regularly used other method such as social media to interact with each other. |  |

CRITICAL AGENDA PROJECT
KNOWLEDGE TRANSFER PROGRAMME – KTP
MINISTRY OF HIGHER EDUCATION MALAYSIA

# Knowledge Transfer Programme - KTP

**Survey on KTP Grant Scheme under RMK-10 (2010-2015)**

**"The Impact of Strategic Knowledge Management Processes on Social Innovation Practises"**

Dear Participants,

I hope that you can spend some of your priceless time to do an interview session. The information that you provide will help us to gain a better insights and improved understanding on the situation concern with the study.

You will remain completely anynymous and the response is stricly confidential. Only members within the research team will have access to the information given. Thank you very much for your time and cooperation.



Your Sincerely,

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Muhamad Nizam Jali

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Contact Number : +6 011-32947246
Email Address : mnj_jali@yahoo.com.my

**KTP Community Chairman:**

Prof.Dr. Zakaria Abas
Email: zakaria@uum.edu.my
Tel : +6 019 417 2466

**SEMI STRUCTURED INTERVIEW**

**SECTION A: Demograhic Characteristics**

## General Information

1. Age:
   *(Umur)*

2. Jantina:
   (Gender)

3. Education level:
   *(Taraf Pendidikan)*

4. Number of years in service/ industry/ community:
   *(Tahun dalam perkhidmatan/ industri/ komuniti)*

5. Name of KTP project:
   *(Nama projek KTP)*

6. Name of university-industry/university-community partnership:
   *(Nama hubungan kerjasama universiti-industry/universiti-komuniti)*

7. Duration of university-industry/ university-community partnership:
   *(Tempoh hubungan kerjasama universiti-industry/universiti-komuniti)*

8. Rolling Phase 1st/ 2nd / 3rd/ 4th/ 5th:
   *(Fasa 1/2/3/4/5)*

9. Interview date/time/venue:

10. Interview duration:

**PART 1:**

1. Could you tell me a bit about yourself i.e. background and experience?

2. Why do you interested to get involved in this partnership project?

3. Based on your knowledge, can you briefly explain about strategic knowledge management processes?

4. What contribution do you think that this strategic knowledge management partnership project contributes to?

5. Based on your involvement within this partnership project, what are the benefits that you and other partners gained?

6. Do you agree that this strategic knowledge management partnership project developed new innovation into the products, processes and services? If yes, what is this new innovation leads to achieve?

**PART 2:**

7. Can you explain briefly about your roles and relationships in this partnership?

8. Do you think that you get involved in every processes of strategic knowledge management within this partnership project?

9. Have you ever been involved in commercializing the partnership project outcome i.e. products, processes and services?

10. What is this commercializing process leads to achieve?

11. Overall what have been your main challenges with regards to commercializing activities?

12. In your opinion, what are the improvement or any added value that must be undertaken in order to make sure that the commercialization activities can be fully achieved in regards to the new highly innovative products, processes or services created within your partnership project?